EDP industry report and market review

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" MAY 29, 1979 • VOL.14,NO.24 P.J. McGOVERN,PUBLISHER

ACS: deButts' Farewell Message? -- Page 3

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COMMUNICATIONS LEGISLATION CAULDRON BUBBLES WHILE FCC RESUMES INQUIRY HEARINGS

There's no dearth of communications-related legislation on Capitol Hill. The tenor of the Foggy Bottom scene has changed from whether there will be deregulation of communications to whither the deregulation. In many respects, the legislation, attempts at rewriting the 1934 Communications Act, looks much like a rerun of 1978 except there are three bills rather than one. While legislators contemplate eliminating the Federal Communications Commission, that same commission is struggling, with the resumption of the Computer Inquiry II, to come to grips with a decision on what it will and will not regulate and at what point does data processing become communications and vice versa.

Moves by both the Congress and the FCC embody the concepts of getting around or eliminating the 1956 Consent Decree and relying upon competition to control part if not all of the communications industry. The Consent Decree generally is interpreted to prohibit AT&T from offering computer services

The key issues in the legislation appear to be whether:

- AT&T has to divest itself of its manufacturing arm, Western Electric, in order to compete in unregulated markets.
- The 1956 Consent Decree barring AT&T from participation in unregulated markets will be discarded.
- Competition will suffice in place of regulation. If not, what degree of regulation is needed and how is it to be administered.
- There must continue to be a separation of international and domestic facilities.

Many have thronged to Washington to testify on the three bills, two of which are in the Senate and one in the House. And it appears that the rewrite (HR 3333) sponsored by Lionel Van Deerlin's House Subcommittee on Communications (sponsor of the original rewrite), may yield to the criticism and require AT&T to divest itself of Western Electric. In the 1978 bill, divestiture was

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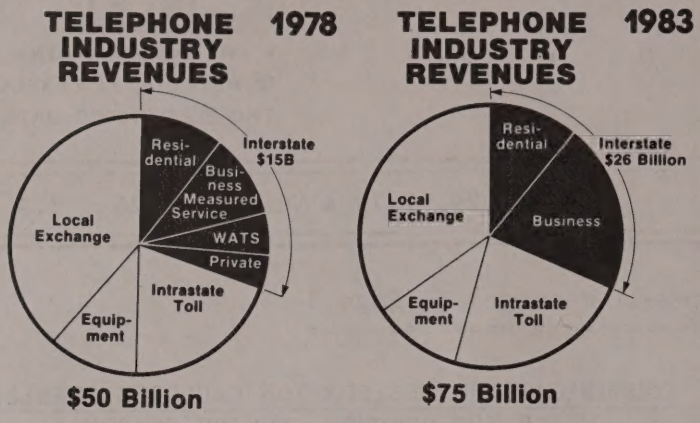

As can be seen, the communications pie is worth fighting over, and is expected to continue its growth.

required but the 1979 version merely requires the two to operate at arms' length. Another popular subject for comment was the need for a transition from a regulated to an unregulated environment. Members of the communications industry expressed concern that the arms' length regulation was insufficient to prevent Bell from utilizing cross subsidies. It would "permit the use of competition to kill competition," according to the North American Telephone Association (Nata). That association as well as the Independent Data Communications Manufacturers warned that deregulation of terminal equipment without the divestiture of Western Electric would allow Bell to totally dominate the terminal market. In addition, they said deregulation needs a carefully planned transitional period.

Some of the key points of the legislation are covered in the table below.

1979 COMMUNICATIONS LEGISLATION

	1978	HR 333 Van Deerlin 1979	S 611 Hollings	S 622 Goldwater
FCC Exist	No	No	Yes	Yes
Divest WE?	Yes	No; Arm's length	No	No
Consent Decree	Out	Out	Out	Out
Deregulation		All but interexchange	2 Classes	2 Classes
Domestic & Internat'l	Yes		Yes, via subsidiary	FCC determine

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Computer inquiry II --

In the meantime, the FCC has put out for public comment a proposal that could obviate the need for defining the boundary between computers and communications by creating a hybrid category of "enhanced" telephone services that would encompass such offerings as AT&T's proposed Advanced Communications Service (ACS). Depending on the approach taken, carriers could be allowed to offer untariffed hybrid services on a resale basis through a separate subsidiary. Alternatively, such services would have to be tariffed. The DP community likely will object to having these services tariffed as that brings the spectre of regulation even closer to the DP door. But if AT&T and others can offer such items as ACS through a separate subsidiary, what are the protective measures to prevent anticompetitive conduct? Even with the unanswered questions, the FCC approach looks like it is trying to advance the concept of competition as something of a regulatory force.

Another FCC proposal calls for deregulation of smaller AT&T competitors and would enable them to vary their rates within certain parameters. In conjunction with this, the FCC would establish a time limit governing the elapsed time between when a small company files a rate request and when the FCC permits it to be effective. Such a move could help smaller companies that often are faced with lengthy delays caused by objections from Ma Bell.

Legislation

Whereas last year there was one version of the rewrite -- from Van Deerlin's House Subcommittee, this year the Senate, not to be outdone, has come up with two versions that are similar in most respects except for CATV regulation.

The Hollings bill (S 611) calls for classification of carriers into two groups "based on the degree of effective competition to which they are subject, their dominance in their own service market or markets and the extent to which their service is deemed essential to the public." The FCC would regulate those in the Category II, who are not subject to effective competition. The regulation would be only to the extent necessary and would be designed to encourage competition where feasible. Thus some parts of AT&T might fall into Category I while others might be in Category II. They would have to deal with each other on an arms' length basis.

Hollings describes the bill as "significantly" altering the Consent Decree and permitting AT&T to enter even the unregulated information services market.

The international sphere structure would change; domestic and international carriers could each engage in the other market via separate subsidiaries.

CAN AT&T MOVE ACS
FROM CONCEPT TO REALITY?

When announced nearly a year ago, AT&T's Advanced Communications System sounded like a natural best-seller (EDP/IR, July 31). The scheme as proposed would enable all types of terminals and computers to communicate with each other without the user having any worry about protocols. In addition, it also looked like AT&T's one-upmanship answer to the U.S. Postal Service in that it could be used for electronic mail. But not everyone was ecstatic about it because it raised the spectre of Ma Bell entering DP services.

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Although users have indicated the time had come for the ACS idea, Ma Bell last February admitted it was having trouble with the software and expected a delay. Some internal Bell papers reportedly indicate AT&T may be prepared to drop the idea if it encounters too much trouble.

This turn of events raises some interesting questions for the rest of the industry. Was AT&T's announcement of ACS anticompetitive in that it was premature? Was it simply former Chairman John deButts' parting shot at IBM and the rest of the DP industry? Indeed, deButts laid the groundwork for the changes ongoing amidst Ma Bell's nether regions. It's no coincidence that Ma Bell now preaches to its employees that IBM is the competition. It's no coincidence that much of top management once wore IBM beanies. And it's no coincidence that Ma Bell a few years ago established a marketing planning group and now is catering specific products to specific industries. Why, Ma Bell even peddles software. How much more into DP can one get without officially being in the business?

In fairness to Ma Bell on the charge of preannouncing, word of ACS surfaced when it told its plans to the Federal Communications Commission (FCC) in asking for a declaratory ruling to utilize existing Bell facilities. Interestingly, Bell did not want to go through the procedure of filing a 214 and was trying to slip ACS in under its existing structure. Although Xerox came to the fore with its plan for its Xten network, there has been silence from other quarters. Who knows whether there may have been others with similar plans who decided to put them on the back burner in the face of competition from the formidable Ma Bell. But amongst those who have entered this multidisciplinary field, Satellite Business Systems, AT&T and Xerox, there have been some frantic efforts to line up the top brass to command the troops. Indeed, as usual, there has been some swapping of generals and technical brains among the three companies.

What are AT&T's options?

Given that AT&T has admitted encountering problems, it still has several options. EDP/IR would not be surprised to see others in the industry beating a path to New Jersey to offer their expertise -- for a fee. Unfortunately, AT&T missed a good bet with Telenet, which has contended all along that its network embodies many of the capabilities proposed by ACS. Telenet's expertise will be hard if not impossible for AT&T to procure because GTE wants to acquire Telenet. Others that might have some skills are such entities as National CSS and others who make their bread and butter from their networking skills. The technology exists, it just may not be under one roof at Ma Bell's. Industry observer Ron Frank suggests that Bell may be linking up with its supplier, Digital Equipment Corp., for some expertise. Indeed, the interrelationships between DEC and Bell are becoming myriad. DEC, which reportedly will supply PDP-11s for the ACS net, to no one's surprise supported ACS in testimony in Washington. It was the sole supplier to do so, although users have lauded the concept. On the other hand, Bell is supplying to DEC some of its Dataspeed terminals. In so doing, this move may take some of the focus off of AT&T as poaching on the DP preserve, for its name isn't nearly as visible as an OEM supplier as it is as an end user marketer. Pretty cozy.

Or, Bell might scale down the offering. It might configure smaller, regional nets run by Bell operating companies or it might take an inhouse net developed by Bell Labs and eventually add upgrades, according to Frank. The

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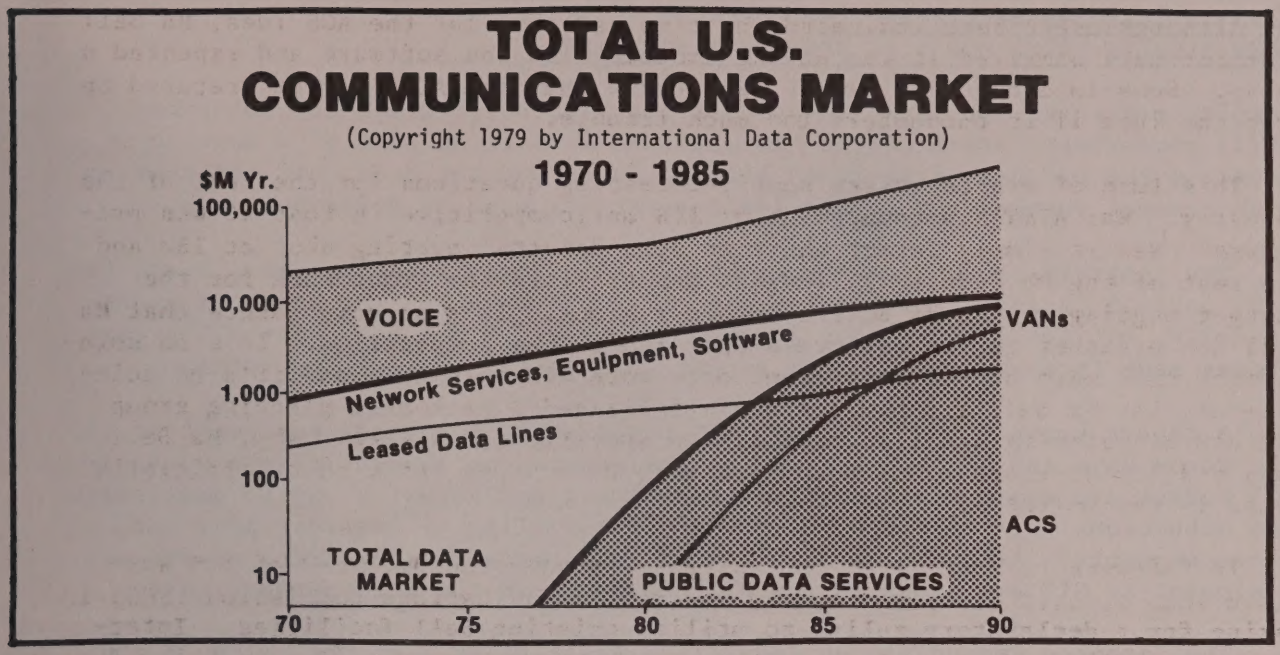

pieces of the puzzle seem to fit. First, there was reported to be an internal battle between Bell Labs and marketing over the shape and scope of ACS. Apparently marketing won the first round and designed the answer to everyone's needs in the form of ACS. But now, if marketing cannot pull that off, the honors may fall by default to Bell Labs, which was probably more prudent in its proposals. And the Bell Labs net, Bell Administrative Network Communications Systems (Bancs) was developed "to satisfy new operating telephone company needs and to permit migration to future network technologies," according to Bell documents quoted by Frank. Thus Bancs may well be upgradeable to a full-blown ACS at a later time.

To be or not to be ... regulated

One of the central issues skirted by AT&T's proposal to the FCC concerns the classification of such a service and whether it does or does not fall under FCC regulation. IBM in its testimony requests that the 1956 Consent Decree be dealt with and that ACS be unregulated. IBM seems to fear that if AT&T offers such a service under regulated status, then eventually IBM's offerings in this area could also fall under the FCC hoof.

Legislation has the ball

Thus, in the communications scene we have the FCC and Congress moving in a similar direction. But since Congress can write the FCC out of existence, perhaps it is up to Congress to lay down some ground rules for the FCC in dealing with the changing communications scene. Certainly the FCC cannot appreciate having to continually walk on a tight rope with the 1956 Consent Decree on one hand and an emerging confluence of growing industries on the other. Add to that Bell's nimbleness at either getting what it wants out of the FCC or blocking what others want, and you have a situation that leads to aggravation of all. If the FCC can satisfy both camps through its hybrid proposal, conceivably Congress would lose some of its momentum to rewrite the Communications Act of 1934. However, with parties from both regulated and unregulated environments, it is unlikely all will embrace the hybrid concept.

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JAPAN'S TELECOMMUNICATIONS PIE
SEEN ELUSIVE PRIZE FOR U.S. DESPITE TRADE TALKS

Despite pressures for Japan to open up its Nippon Telegraph and Telephone (NTT) procurement practices to non-Japanese bidders as part of a move to equalize the balance of payments between Japan and the U.S., NTT has come up with several reasons why it shouldn't alter its ways of doing business.

The Japanese communications market is alluringly sizeable, and, alas, the U.S. portion is rather minuscule. The NTT buys $3.2 billion worth of goods annually, but foreign products account for only $15 million. And NTT's purchases made through open bidding amount to a paltry 3.8% of the total.

A report known as "John's Report," prepared by the trade subcommittee of the House Ways and Means Committee acknowledges some aspects of the Japanese NTT market are easier to penetrate than others and suggests way to ameliorate the situation. For instance, it categorizes selling of American gear into three segments: sales to te mainline NTT net; sales of auxiliary or off-net equipment to NTT and sales to non-NTT customers in the interconnect mart.

The Japanese Communication Industries Association pegs the value of the markets during fiscal 1977 ending March, 1978 at $1.6 billion in communications gear sold to NTT, about $850 million worth of Japanese communications gear to private sectors and about $650 million of interconnect gear to private organizations. However, the report recognizes American firms are virtually excluded from the interconnect mart because of difficulty obtaining technical standards, which are very exacting, and long delays in the approval cycle.

The report suggests opening up the auxiliary and off-line market first and indicates some Japanese reservations about American participation can be overcome if NTT opens its procurement to Americans at the research and development stage. However, EDP/IR thinks such a suggestion is akin to whistling in the wind, for it can be seen that the involvement of companies at the R&D stage is the capstone to the entire NTT way of doing business that effectively locks out foreigners.

Despite requests that NTT purchase $600 million or 19% of its annual procurement in the form of foreign equipment, NTT is reluctant to include mainline communications equipment and computers in its shopping list. In support of NTT's position, two industry associations sponsored full page ads in Japan's leading papers declaring that use of foreign equipment would endanger NTT's ability to sustain its high technical standards.

How does NTT justify its closed door system? With arguments such as these:

- Separating procurement from product development would result in dissemination of proprietary knowledge via specifications, thus harming the vendors who worked with NTT on product development. NTT, which does not have manufacturing capabilities, works with Japanese firms from the R&D stage onward to meet its needs.

- NTT would have difficulty being assured of stable supply of parts and of adequate product reliability. Currently all devices bought by NTT embody standardized methods for the construction and maintenance of telecommunications facilities. Also, mixtures of dif-

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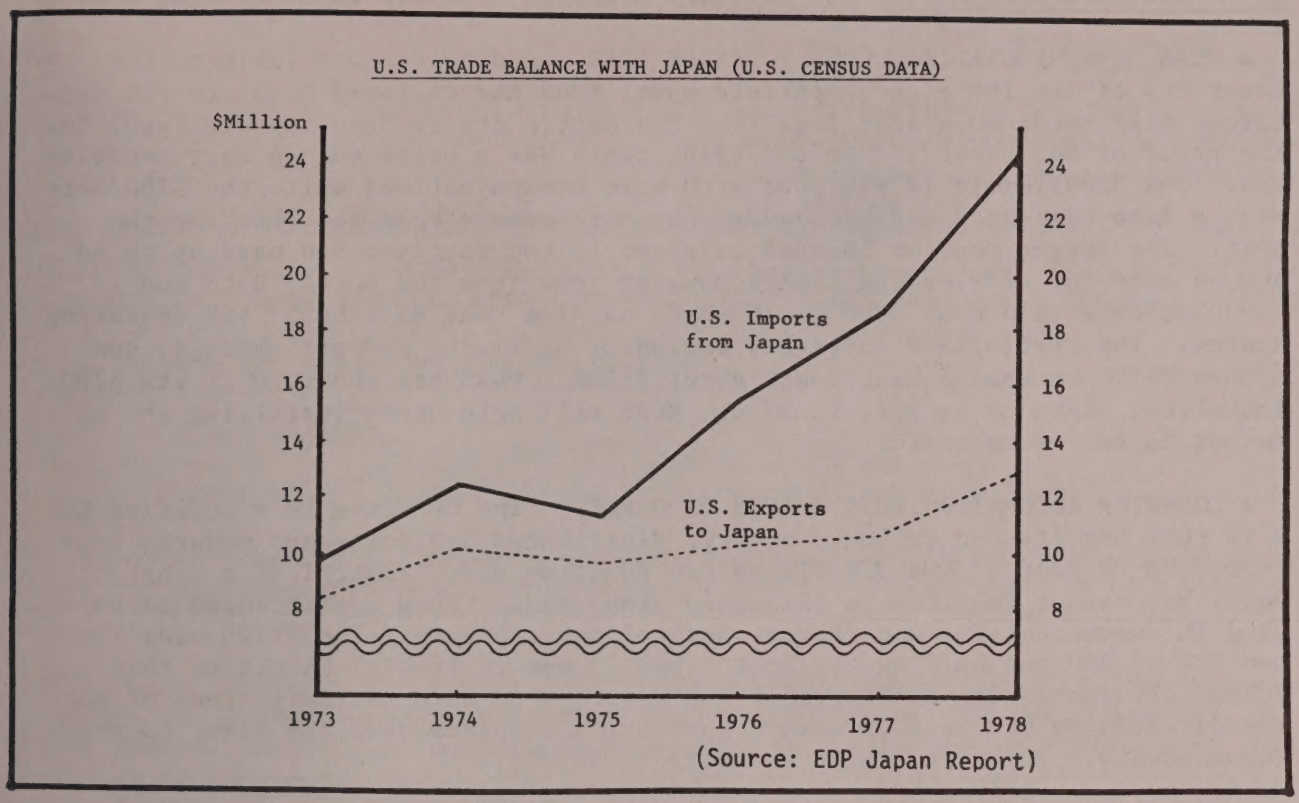

ferent types of equipment would render difficult any process such as remodeling of the phone system.

- Difficulty ensuring product reliability through quality control checks at plants. Also, bids are awarded on the basis of price, not quality, rendering Japan's phone system mean-time-to-failure of nearly 14 years subject to deterioration.

- Procurement bidding takes time and the delivery period would be prolonged because competitive bidding makes advance planning of production difficult. Because of manufacturers' uncertainty of garnering awards, prices might rise.

Thus goes the Japanese argument against procurement of foreign supplies for its NTT mainline network. But the prickly thorn of the issue really is that this argument is not only against procurement from foreigners but really against competitive procurement. So it may be doubly hard for the U.S. to wear down this barrier.

Despite the stalemate, NTT in a proposal vows to solve in a "forward looking manner" the problem by 1981, the year the international procurement code from the Tokyo round of trade talks becomes effective. Also, NTT apparently has agreed in that proposal to improve application processes in the interconnect market "in due course."

Correction

NCR's 1978 revenues (EDP/IR, April 25) from continuing operations were $2.6 billion, a 13% increase over the 1977 figure.

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• NCSS ADDS SPECIALIZED CPUS TO SALES LIST. Adding a new wrinkle to its courtship of the IBM plug-compatible mart, NCSS has tailored boxes to fit different user needs more specifically. The battle cry is "two (specialized) for the price of one (host)." In addition, there was a price cut on host processors. The 3200/Remote is equipped with more communications while the 3200/Server, a data base back end processor, has more memory than the other or the host. The Server must be located adjacent to the host and can have up to 4M and be used for off-loading time-consuming jobs from the host. Both run in conjunction with a host 3200 or IBM-type machine that uses NCSS' VPS operating system. The specialized packages, including software, and peripherals, cost around $122K whereas a host costs about $250K. NCSS has about 10 of its 3200s installed, right on target, it said. NCSS will help users installing its machines to set up networks.

• COMPUTER AUTOMATION PUTS SLAVES ON MARKET. The CA slave is a modified LSI 4/10 that has its own on-board memory, distributed I/O ports and program control. Up to four of the 32K slaves can function under control of a single host, but cannot function in the stand-alone mode. They are intended to be used in communications and process control environments. The 4/10S uses its own 32K of RAM and half of the host's public memory (64K). CA claims this scheme eliminates disadvantages of multiprocessing such as limitations of bus speed, software overhead or memory contention problems when the slave operates autonomously. Price in single quantity is $1,990.

• BACHE IS PUTTING TERMINALS AT ITS FINGERTIPS . . . lots of them in fact. It signed an order worth $25 million for GTE Financial System One, a computer controlled quotation and communication system with about 1,800 terminals.

• WANG BLENDS WORD, DATA PROCESSING capabilities on its word processing systems through the availability of a controller that handles both asynch and bisynch communications. The System 5 and stations on the 20, 25 and 30 can look like teletypewriters or 2741 terminals or can be used with 2780/3780 protocols. The communications option costs $1,000 to $1,500 depending on the host. Wang also added versions of work stations with 16K and 32K memory priced at about $4,000. Citing shipments of over 1,000 workstation/mo, Wang cut prices on its System 25 and 30 by 5% and 10%, respectively.

• ELECTRONIC MAIL GETS SOME FRINGES. Computer Corporation of America has endowed its Comet electronic mail system with word processing capability -- for all those inaccurate typists out there. The Comet word processing combination can be used with a variety of terminals including those from DEC, Wang and other WP vendors. . . . And Computer Communications Inc. announced a Facsimile Message Switch that provides store-and-forward capabilities for facsimile data trasmissions.

• TELL IT TO THE COMPUTER . . . OR THE NOVELTY of electronics has come of age. MSI Data Corp. has put together a terminal it calls "Tellus," a customer service evaluation system. A test in four hotels showed about 15% of the guests used the device, and most said they preferred the pushbutton questionnaire to comment cards.

• PACK YOUR FOAM CUSHIONED WEDGIES for the National Computer Conference -- exhibitors will range over four Coliseum floors plus one in a hotel.

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Small systems on rise in Government -- Page 5

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MAINFRAMERS, INDEPENDENTS TACKLE MANUFACTURING MARKET WITH SOFTWARE, SHOP FLOOR TERMINALS

The manufacturing market has long held strong attraction for vendors of computer hardware and software alike because of its predominant position -- over 25% of the value of the U.S. installed base in both 1977 and 1978.

Recently several mainframers have begun offering integrated software approaches tying in such various aspects as the ordinary accounting and shop floor control, materials requirement planning (MRP) and inventory control. Emerging hot areas are shop floor control and such related applications as production scheduling and capacity requirements planning. One of the trends evident is the increased attention to specialized terminals on the shop floor.

- IBM GSD offers the 5230 shop floor terminals and DPD endorsed mag stripes and scanners with its 3630 plant communications terminals.

- Honeywell teamed with its Incoterm acquisition to formulate specialized terminals for functions such as labor reporting, time and attendance, and gas panel display data entry units.

- NCR is putting forth data collection terminals manufactured by its Data Pathing Division.

A look at some installed base figures shows why the mainframers are tackling the manufacturing mart. The value of the installed base of general purpose computers in 1978 was $12.6 billion in the discrete and process manufacturing sector, or 25.8% of the total $48.7 billion base, according to IDC figures. While the value of installations in the manufacturing sector posted a healthy 14.5% growth rate compared with year end 1977, nevertheless that area declined slightly from a 26.1% share of the total installed base in 1977.

There are several sources of software for this growing market: manufacturers; independent software houses; and service bureaus. The fast pace of growth in the independent software mart may be one reason the manufacturers are putting some serious efforts into their products. Revenues of manufacturing applications of independent software vendors and computer service com-

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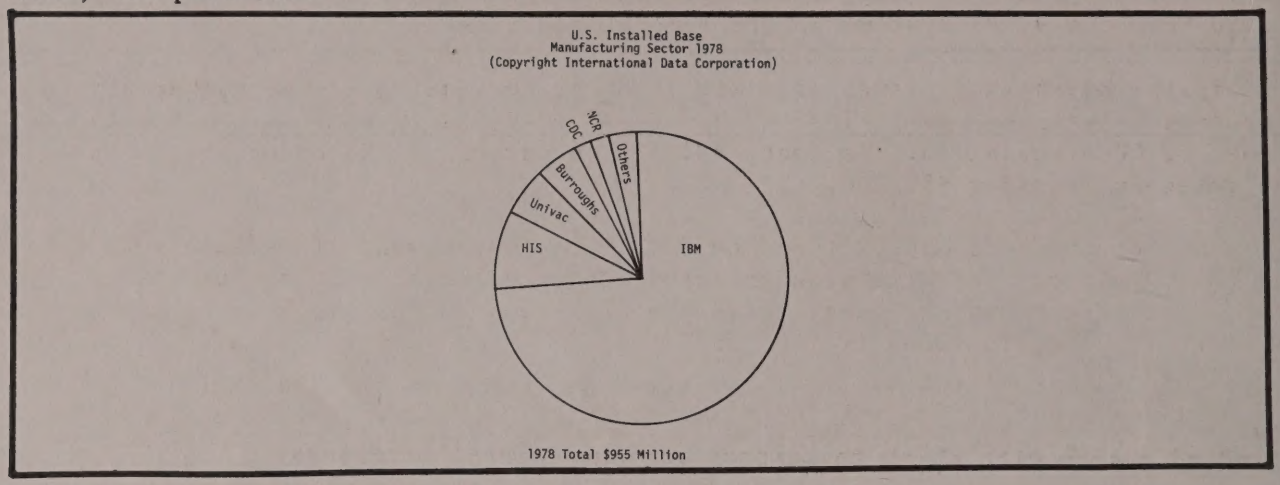
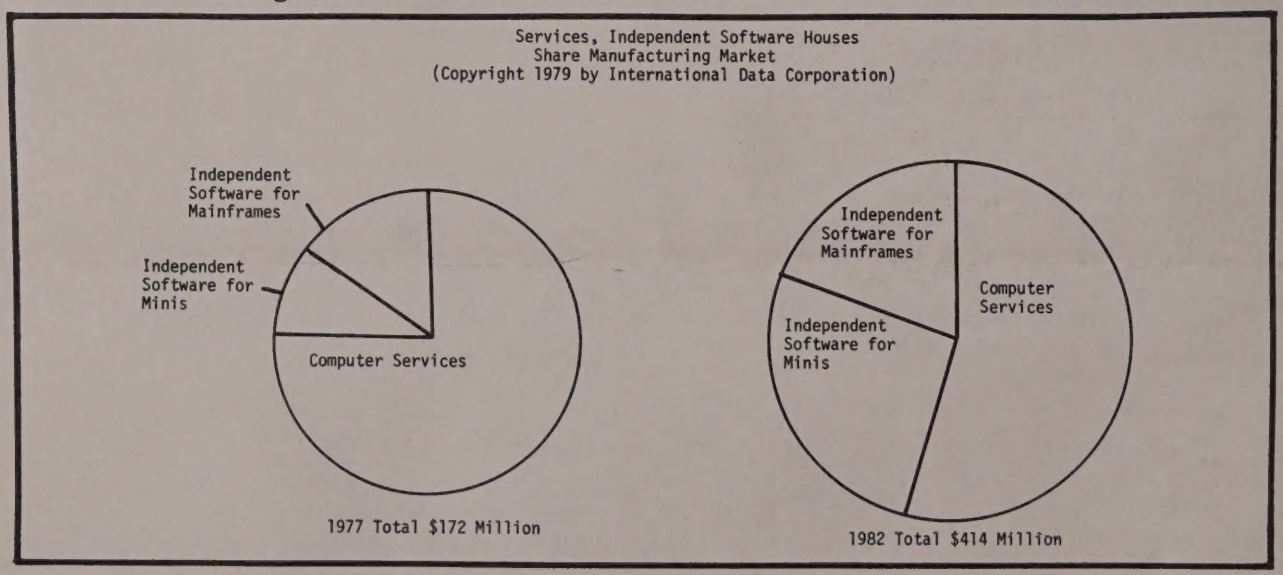
panies should more than double from its 1977 base of $172 million to $414 million in 1982, according to a report from International Data Corp. Manufacturing application packages for minicomputers is outpacing the rest of the field with growth of over 600% from $15 million in 1977 to $106 million in 1982, IDC predicts.



Discrete manufacturing industries are defined as SIC classes 25 and 34 through 39. IDC estimates the potential market for manufacturing applications in the discrete sector includes more than 16,000 plants with 100 employees or more and over 30,000 plants with between 20 and 99 workers.

As might be expected with a projected compound growth rate of nearly 48%, the minicomputer manufacturing application segment is luring vendors from all corners, including those who had previously been targeting mainframes and computer services organizations. One reason why the mini market's growth should soar is the advent of distributed processing. Also, users may believe that a mini is less expensive than a service bureau, whose costs can easily be identified with specific applications. More service bureaus are expected to court the manufacturing market.



Of 170 survey respondents using an inhouse computer for manufacturing applications, 60% had developed their own software; 32% were using packages from their hardware vendor and 8% were using packages from independents. There seem to be benefits from buying packages. Package users, regardless of their

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company size, generally demonstrated higher levels of implementation than those who developed their own software. Also, the package users were less fearful of implementing new applications, according to the report.

As one might expect, the objective of manufacturing application programs is to reduce the cost of doing business and improve efficiency. One of the first tasks to assign to a computer is inventory control, for inventory represents hard cash. Not surprisingly, 89.4% of the survey respondents with an inhouse computer use inventory control application while 87.1% had bill of materials. The next most popular application, used by 65% of the survey population, was product cost estimation. Then came purchasing, production routing, production scheduling and job cost reporting. The key is to have various applications interrelating, as is required by a materials requirements planning system (MRP).

Despite the different approaches with special-purpose vs. generalized terminals, much of the name of the game appears to be in the software. An independent company, Manufacturing Software Systems Inc. in Williston, Vt., evaluates various material requirements planning systems by developing a standard system with which to compare various makers' offerings.

Univac targets market

Univac's Charles Williams, vice-president and general manager of the Americas Domestic Division, is high on the manufacturing market. "The computer has the potential to have the greatest impact on manufacturing since Henry Ford initiated the assembly line." Five years ago Univac decided to make a commitment to the manufacturing market and since then has spent about $20 million on development of Unis, Univac's industrial System, which has over 200 companies using and/or installing it.

But Williams recognizes that the manufacturing mart requires a special sales touch, and in 1977 Univac established a dedicated manufacturing marketing organization. To establish and maintain its new manufacturing marketing organization Univac has invested another $25 million.

Univac anticipates exceeding its original goal of tripling in five years its sales in manufacturing and thinks it can accomplish its goal in four years. Bookings from its specialized marketing organization have been growing at a rate of 29%/year rather than the original goal of 21%/year. And Univac's compounded growth rate of installed base in manufacturing companies is nearly triple that of the industry, 22% vs. 8%, Williams said. By 1982, Williams expects sales to manufacturing companies will exceed 35% of Univac's total sales.

Racal-Milgo in Florida, a user of Unis, offers some tips on installing a manufacturing system. Much of a successful implementation hinges on educating employees via seminars and internal training so that they want to use the system. An implementation task team defined what the system was going to do for Racal-Milgo and tailored reports so Unis became their system. Areas covered included order policies, lead times and rules by which to run the shop.

The payoff seems to be there. Charles Weston, vice-president of finance, observed that in the time since Racal-Milgo first looked at a manufacturing system its sales have more than doubled to around $60 million. Yet its inventory has not risen at all, he said.

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Overview of mainframers' entries

IBM's manufacturing software has been revitalized for distributed processing and the 4300 line in the form of Communications Oriented Production Information and Control System (Copics). The online-oriented system, designed to facilitate distributed processing, includes 11 programs with such wanted features as the bill of material interfacing with material requirements planning.

Available as of last April 6 and initially under DOS only, Copics costs $1,015/mo for nine programs or less than $40,000 purchase. Users pay monthly license fees for 36 months. Copics is a field developed program.

With Copics, each plant can run independently of the host and transmit only needed data to the host, IBM said.

IBM's 3630 plant communication system utilizes three various types of terminals and a mag stripe encoder printer. The 3641 reporting terminal, which has a 22 character display, can attach a hand-held scanner or slot reader. The 3643 appears more generalized in nature with up to 1,024 characters on a gas panel display. The 3644 combines analog and digital I/O capabilities and can provide an automatic link to various instruments and machines.

Honeywell's Factory Management System, oriented to factory data collection in a distributed environment, consists of three basic hardware elements that can form two types of systems. Ruggedized terminals for shop floor reporting (Series 3000) can be hung on either a Level/6 or an SPD unit from Incoterm that functions either as a front end concentrator or as a stand-alone terminal processing unit. The software involved includes applications such as production scheduling and control system; and inventory management/materials requirements planning system. The Factory Terminal Facility/6 (FTF/6) enables Gcos 6 Mod 400 to communicate with the new terminals. And the Series 3000 have data collection facility software.

The Honeywell system represents the first product offering combining offerings from both HIS and its Incoterm division. The Factory Management System can function as either a stand-alone or distributed system. A Level 6 Model 43-based system, peripherals and 20 of the 3000 terminals sells for $116,660. The programmable terminal processing unit costs $22,390 while individual 3000 terminals range from $1,750 to $2,440, with volume discounts available. Software prices range from $80- $100/mo for the Factory Terminal Facility/6; Inventory Management System/6; Production Scheduling and Control/6.

NCR recently announced user programmable terminals from Data Pathing, the 200 series, that range in price from $2,145 to $5,595. There is also a line of single-function shop floor units. NCR has three different products for its various sizes of systems. All systems use the same basic data elements, enabling users to migrate upwards. The 8100 has the Interactive Factory Management System that has basic functions such as inventory and bill of material explosion. For the intermediate size plant, the Interactive Management Control System (IMCS II) fits on the 8200 and 8400 and is a data base oriented system with materials requirement planning and inventory capacity planning. The Data Pathing terminals can be attached to this system.

The top of the line is the Mission system, a closed loop, on-line, data base oriented package that also includes master scheduling.

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Burroughs has one 10-module offering, the Production Control System (PCS-3), that fits on its CPUs from the B1800 up. The PCS-3, designed to be an on-line, real-time system, emphasizes its master production scheduling capabilities and includes such features as a generalized message control (gemco) that acts as a traffic cop for terminals and also enables PCS-3 to interface with other packages, such as accounting functions. The various modules range from $3,300 to $6,425 and a representative system costs between $15,000 and $20,000 or $900/mo to $1,000/mo. The entire package costs about $56,000 or $1,900/mo. In addition, it has an 11-module Manufacturing Business Management System for the B 80, B 800 that totals $586/mo or $18,177 including accounting.

Hewlett-Packard has added a Standard Product Costing package to its family of MFG/3000 which includes Engineering Data Control/3000, Inventory and Order Status/3000 and Material Requirements Planning/3000. The SPC costs $3,500 plus $60/mo and the others $5,000 each plus $150/mo. The HP approach utilizes general-purpose terminals, the 2645A.

IBM's General Systems Division added a production control and costing package to its Manufacturing Accounting and Production Information Control System (Mapics) for a total of 11 packages for the 34 and 38 for $687/mo.

Services court manufacturers

The manufacturing market is being specifically targeted by many services companies. The following examples give an idea of the broad range of approaches and scope of services.

Xerox Computer Services has formed a new division, Arista Education and Consulting, to court manufacturers for its on-line system that provides inventory control, MRP, purchase order and cost planning and control applications.

The Service Bureau Company added a Shop Floor Control System to its MFG/PLUS Integrated Manufacturing Control System. The Shop Floor system delves into the flow of work and includes production routing, job scheduling and tracking with tooling and labor requirements by machines within work centers.

University Computing Co. and Applicon, Inc. have teamed up with a joint marketing agreement and standardized their products to provide a total computer aided design and computer aided manufacturing (Cad/Cam) capability. Applicon makes three dimensional graphics systems while UCC provides software oriented toward programming numerical control machinery.

SMALL COMPUTERS ON THE RISE IN FEDERAL, STATE GOVERNMENTS

More powerful minis and the trend to distributed processing could be two of the reasons why both federal and state governments are installing a growing percentage of minis.

The National Association for State Information Systems' (Nasis) annual report on "Information Systems Technology in State Government" shows minicomputers doubled both in terms of number installed and in terms of percentage of all systems installed by state governments. But mediumand small-scale systems may be approaching a period of growth in state government, for states have recently been using leasing more frequently as a method of acquisition for

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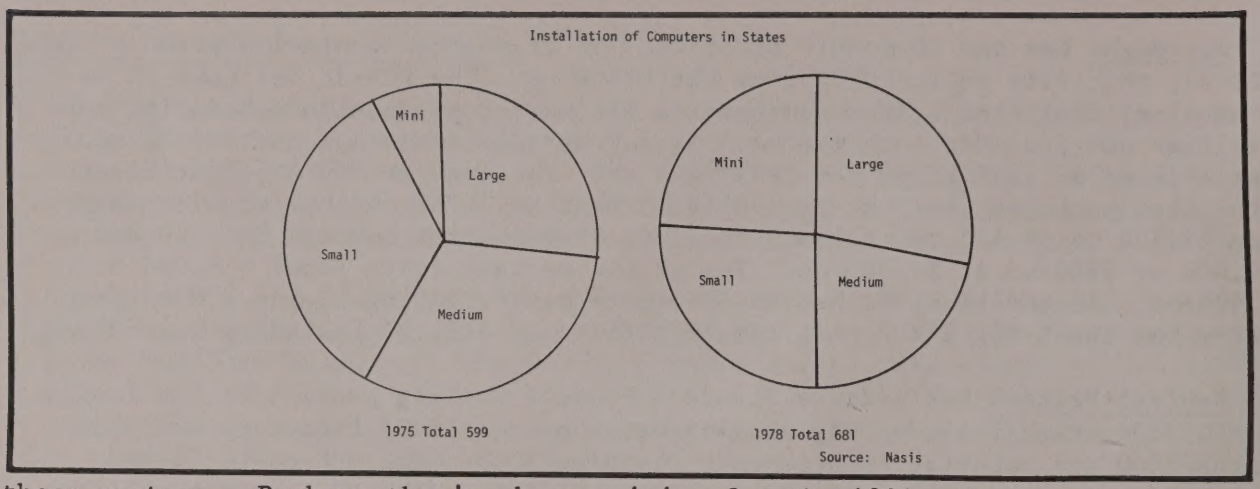

these systems. Perhaps they've been waiting for the 4300 and the other makers' latest round of systems with improved price/performance(EDP/IR, April 9). However, leases are used less frequently than previously with large systems and minis.

The states reported an annual increase of 15% for DP spending compared with 1977, closely in line with the 15.8% increase reported by the federal Office of Management and Budget (OMB) in 1979. However, expenditures for DP as a percentage of total state costs rose only .07% to about .75% in 1978. Nasis estimates the total DP expenditures were about $1.23 billion in 1978.

Hardware expenditures continue to account for a smaller portion of the budget -- 27% ($360 million) in 1978 compared with about 41% seven years ago. But the costs attributable to data communications has jumped from 6% of the total budget in 1972 to 18% in 1978.

Personnel costs continue to comprise 51% of total DP expenditures for the states, just as they did in 1972. But there has been nearly a 100% rise in expenditures for consultants. As a corellary, the states identified as their number one problem recruitment of qualified personnel. Three years ago this item was ranked eighth among external problems related to information systems. The previous most pressing concern was management understanding.

Despite the trend to consultants and the difficulty in getting good people, spending for packaged software remains about 1% of the total budget. Although the number of packages didn't increase significantly, Nasis reports many states changed packages used for a specific purpose, which indicates an upgrading of capabilities.

It appears much of the work performed by consultants was federally funded. Nasis labeled the 55% increase in systems and applications developed with federal funding, either full or partial, as "the most striking change seen in the intergovernmental aspects of state information systems in the nine years" of its report.

Federal mart not so hot in 1978

Although the number of computers installed in the Federal government rose 9.5% to 12,190 during 1978 compared with 1977, the Feds' DP equipment expenditures were less than half of those the previous year, according to the federal

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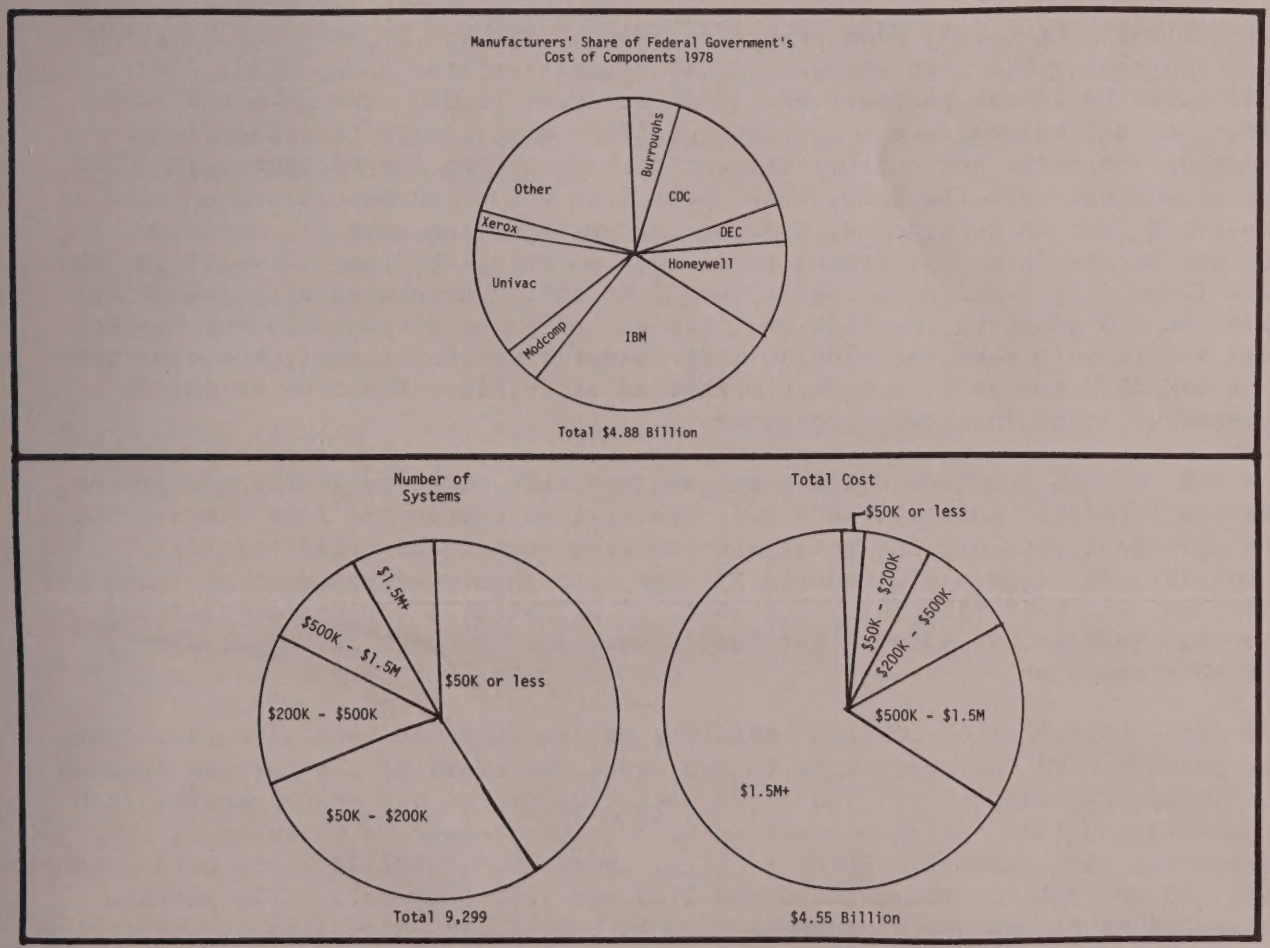
census from the General Accounting Office. The total cost of equipment acquired in 1978 was $320 million compared with the 1977 figure of $753 million.

But although the growth in number of CPUs was not outstanding during 1978, since 1975 the number in the federal government grew 41%. In 1978 there were 12,190 CPUs and 9,299 systems in the Federal government.

Digital Equipment strengthened its first place ranking in the number of computers installed. As of 1978 it had 24.5% -- 2,992 CPUs -- of the total number of CPUs installed. In fact, 83% of the number of DEC computers is in the category of under $50,000.

Where do the Feds have all of the CPUs? The Department of Defense (DOD) has about half of the total with the civilian agencies accounting for the rest. The Department of Energy holds the title for having the largest number of CPUs -- 2,395, followed by the Air Force, Navy and Army and Nasa.

But CPUs are only one component and account for about a third -- $1.66 billion -- of the mammoth federal DP holdings, which in 1978 had an estimated cost of $4.88 billion that includes CPUs, storage units, I/O gear, communications terminals etc. The pie chart below shows the distribution of the federal dollar among the installed bases of various vendors and includes components.



Correction: Itel's product line of systems of the size of the 4300 and below consists of the AS/3-5 (EDP/IR,April 9). Other systems include the AS/7031 (formerly the 5/3) and an attached processor (AP), the AS/6, AS/6-2 and an AP.

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• IBM TEASES 370, 30X USERS BY PERMITTING 3880 USE -- but under limited choice of operating systems. And the 3370, the 571M byte disk, doesn't run on 370s or 30X. IBM expanded the capacity of the 3880 and said it can be hooked to 370s that are 145s or larger and 30X. The operating systems that support the 3880 on the 370 and 30X are: VM/370 release 6; OS/VS 1 releases 6.7 and 7.0; and OS/VS 2 release 3.8. The 3880 doesn't accept the 3340/44 under OS/VS 2. The price of the 3880 is the same as it is with the 4341. Coupled with the disk price reductions, this announcement creates interesting possibilities for those who can use it. Perhaps even bigger news is that the capacity of the 3880 has been doubled with the addition of an optional two channel switch pair which allows up to four channels to be switched to each storage director. Therefore a total of eight channels can have access to a 3880 and can be from same or different processors. This feature is priced at $17,200 purchase or $400/mo on a two year lease. And the 3880 is becoming more versatile -- it will be able to handle strings of either 3340/3344s or 3333/3330 and/or 3350s. But the 3340s cannot be intermixed on a 3880 with the 3330/3333 or 3350. The initial customer shipment of 3880 is fourth quarter, 1979. Another feature added is an optional remote switch feature that allows remote enable/disable of channel interfaces to the 3880. So the 3880 is beginning to grow in capacity, and EDP/IR thinks we'll see further growth in capability.

• IBM UNITS HAVE TENT SALE OF DISKS, SMALL SYSTEMS. To mark May day, IBM Data Processing Division chopped prices of disks of the 3330, 3333, 3344 and 3350 types by 25% on purchase and 17.5% on lease plans. The 3344 and 3350 also received maintenance price cuts of 17%. Most likely the Giant is clearing the decks for another type of disk -- but in the meantime, if one's 370 or 30X can take the 3880, this looks like a good chance to add on disk capacity. Not to be ignored, General Systems Division sent its May day message in the form of purchase price cuts on the 5100 from 11% - 17% and the 5110 from 12% - 17% and on the System/32 by 30%. There were also reductions (17%) on I/O gear for the 5100 and 5110 and (10%) on assorted features. The move should help make the 5100/10 more competitive in the small business mart -- a 64K 5100 now sells for $8,740 instead of $9,810. The move on the 32 appears to be an inventory clearance.

• NCR TO MAKE SCANNING UNITS under an agreement with its scanning supplier, Spectra-Physics. Initially NCR will use optical components from Spectra but the agreement provides for total manufacturing eventually with royalty payments. NCR's base of scanning systems more than quadrupled in 1978 and the rate has continued into 1979, NCR said. . . . Speaking of optical readers, Computer Devices has added a bar code reader for use with its Model 1206 portable computer.

• DEC's RSX-11M PLUS DOUBLES CAPACITY; DATASYSTEMS CAN TALK WITH IBM. The new RSX-11M-PLUS can support twice the users and tasks of the current version and is upward compatible. The 11/70 operating system has other goodies such as overlapped seek, which permits up to 30% improvement in throughput, and re-entrant task support. Price is $12K. With RDCP 2780/3780, DEC Datasystems 150, 320 and 350 can communicate via 2780 and 3780 protocols. The package needs 56K bytes and costs anywhere from $600 to $1,980 depending on the system model. And for the VAX 11/780, DEC has a Pascal compiler developed in cooperation with the University of Washington. A single-system license is $2,500 for non profit institutions and $5,000 for all others.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" APRIL 25, 1979 o VOL.14,NO.22 P.J.McGOVERN,PUBLISHER

Buying a company not synonymous with keeping management -- Page 6

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MAINFRAMERS LOG BIGGEST ANNUAL REVENUE LEAP SINCE 1973 AS OUTRIGHT SALES ECLIPSE RENTAL, SERVICES GROWTH

Not since 1973 have mainframers' revenues from computer operations shown a 17% leap over the year-ago revenues. The crystal ball gazers predicted a banner year for the DP industry in 1978, and to almost no one's surprise, that's what happened. And the strength apparently has continued through the first quarter of 1979, although most economists are now somewhat divided on exactly when the balloon will soften. But the mainframers should continue to generate hefty backlogs for a while longer as the new round of product introductions with increased price/performance (EDP/IR, April 9) should keep the order pot brewing.

Several interesting facts about the mainframers' business can be discerned from looking at numbers. Among them:

- Revenues from computer operations of seven mainframers have doubled since 1973 -- from $14 million in 1973 to $28 million in 1978. While doubling may not sound like much considering the rampaging inflation, the feat becomes significant when one considers the industry's unusual propensity to offer more bang for less buck.

- The Giant's share of the seven makers' computer revenues continued to decline last year despite the volume of 30X deliveries. In 1973, IBM held 64.3% of the revenues; that figure in 1978 was 60.9%.

- All but IBM and DEC managed to eke far larger gains in earnings than total revenues for both the year and the recent quarter; surely a healthy trend. Despite IBM and DEC, overall the seven averaged an 18.3% growth in earnings compared with a 17% growth in revenues for the year.

- The group's revenues from outright sales in 1978 grew faster than those from rentals and services, even excluding IBM and its recent strong sales orientation. As a group, sales revenues rose 20.3% vs. 12.8% for rental and services -- or 17.7% vs. 16.2% without IBM. Four companies showed faster growth in sales.

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REVENUE FROM COMPUTER OPERATIONS
Five-Year Comparison
(Copyright 1979 -- International Data Corporation)

	1973	1978	Factor
IBM	$9,234M	$17,074M	1.8
NCR	885	2,240	2.5
Burroughs	1,068	2,083	2.0
Sperry Univac	1,123	2,020	1.8
CDC	948	1,868	2.0
DEC (6/30)	265	1,437	5.4
HIS	843	1,294	1.5
TOTAL	$14,366M	$28,016M	2.0

SYSTEMS MANUFACTURERS' REVENUE
$ Million -- Computer Operations
(Copyright 1979 -- International Data Corporation)

	1973	1974	1975	1976	1977	% Δ	1978
IBM	9,234	10,510	11,850	13,400	14,765	15.6	17,074
NCR	885	1,122	1,415	1,674	1,944	15.2	2,240
Burroughs	1,068	1,293	1,457	1,612	1,794	17.1	2,083
Univac	1,123	1,294	1,433	1,467	1,726	17.0	2,020
CDC	948	1,101	1,246	1,358	1,513	23.5	1,868
DEC (6/30)	265	422	534	736	1,059	35.7	1,437
HIS *	843	856	856	914	1,037	24.8	1,294
TOTAL	14,366	16,598	18,791	21,161	23,838	17.5	28,016
IBM %	64.3	63.3	63.0	63.3	61.9		60.9

*Excludes revenues of CII-HB of which Honeywell owns 47%. Combined revenues of HIS and CII-HB in 1978 were $2.1 billion.

- The seven mainframers posted an 18.3% average gain in earnings, outpacing the 17% rate shown by the Fortune 500 companies, while the DPers' gain in revenues -- 17 -- clearly outdistanced the 12.2% gain registered by the Fortune 500. The calculations for these computer company figures include corporate earnings and revenues except for CDC, where Commercial Credit (CC) results are excluded. And NCR's $110.5 million from the sale of Appleton was not included.

Don't expect a repeat ...

Many of the mainframers emphasize they do not expect the upcoming quarters to show gains similar to those of the first quarter, calendar 1979, when, as a group, earnings rose 19.5% with a high of 168% (CDC) and a low of 13% (IBM).

Some spectacular leaps in earnings

Control Data wins the prize for the most spectacular percentage growth for its computer operations for both the year (even without its $5 million in special credits) and the recent quarter. Perhaps it gets the prize because it kindly distinguishes contributions from its computer efforts and Commercial

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MAINFRAMERS' EARNINGS AND REVENUES 1977-1978
(12/30/78)

	Earnings ($ Million)			Revenues ($ Million)		
	1978	1977	%Δ	1978	1977	%Δ
IBM	3,111	2,719	14	21,076	18,133	16
NCR*	208	142	46	2,500	2,312	08
BURROUGHS	253	215	18	2,460	2,127	16
SPERRY RAND	214	165	30	4,065	3,475	17
CDC(w/out CC)	41	20	105	1,868	1,513	24
DEC	153	128	20	1,601	1,262	27
HONEYWELL	201	145	39	3,548	2,911	22
TOTAL	4,181	3,534	18.3	37,118	31,733	17

* Excludes $110.5 million gain from sale of Appleton Papers Division.

Credit, its insurance/finance subsidiary. While makers generally will divulge revenue information for their computer operations, earnings data is more closely guarded. Honeywell and Sperry Rand present their computer operations results along with those of their other segments.

CDC's 1978 revenues are nearly evenly divided between sales and the category of rental and services. Revenues from sales grew 29% while those from rental and services rose 19%, following the industry trend for the year. CDC's rental base of leased computer equipment rose 21%, reflecting demand for the Cyber 170 series. "The largest volume increases occurred in the peripheral products area, where sales of peripheral equipment to other manufacturers increased 56% over 1977," CDC remarked.

NCR, with improved margins resulting from its switch to solid-state products, posted an earnings gain of 46% on an 8% rise in revenues. These figures are 123% and 13%, respectively, if one includes the gain from the sale of its Appleton Papers Division. In the revenue arena, NCR was one of two companies whose rental and service revenue growth outpaced that of sales. NCR posted a 16% rise in rental and services for the year, crediting international maintenance services as a principal contributor.

MAINFRAMERS' QUARTERLY EARNINGS AND REVENUES 1977-1978
(3/30/79)

	Earnings ($ Millions)			Revenue ($ Millions)		
	Recent	Yr Ago	%Δ	Recent	Yr Ago	%Δ
IBM	667	589	13	5,295	4,432	20
NCR*	30	23	30	590	559	06
BURROUGHS	42	34	26	588	505	17
SPERRY RAND (12/30)	57	40	44	1,040	906	15
CDC (w/out CC)	12	4	168	492	400	23
DEC (12/30)	38	33	17	426	347	40
HONEYWELL	60	35	68	967	789	23
TOTAL	906	758	19.5	9,398	7,938	18.4

*Includes results from Appleton Division last year. A restatement excluding these results gives NCR a 78% increase in earnings and a 17% rise in revenues for the first quarter.

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SALES VS. RENTAL AND SERVICES REVENUES 1977-1978
($ Millions)
(Copyright 1979 -- International Data Corporation)

	TOTAL REVENUES		SALES REVENUES						RENTAL & SERVICE REVENUES					
						% Total Revenues		Shift Toward				% Total Revenues		Shift Toward
	1978	1977	1978	%Δ	1977	1978	1977	Sales	1978	%Δ	1977	1978	1977	R&S
IBM	21,076	18,133	8,755	24	7,090	41.5	39.1	+	12,321	12	11,043	58.5	60.9	-
NCR*	2,500	2,312	1,464	3	1,416	60.3	61	-	1,036	16	896	39.6	38.7	+
BURROUGHS	2,460	2,127	1,384	17	1,181	56.3	55.5	+	1,038	14	910	42.2	42.7	-
SPERRY RAND (3/31/78)	3,650	3,270	2,824	13	2,501	77	76	+	825	7	769	22.5	23.5	-
CDC (w/out CC)	1,868	1,513	921	29	717	49.3	47.4	+	926	19	777	49.6	51.3	-
DEC (6/30)	1,437	1,059	1,129	33	848	78.6	80	-	308	46	211	19.2	15.5	+
HONEYWELL	3,548	2,911	2,846	23	2,313	80.2	79.5	+	702	17	598	19.8	20.5	-
TOTAL GROUP	36,539	31,325	19,323	20.3	16,066	52.9	51.3	+	17,156	12.8	15,204	47	48.5	-
W/OUT IBM	15,464	13,192	10,568	17.7	8,976	68.3	68	+	4,835	16.2	4,161	31.3	31.5	-

*NCR 1978 results do not include $110.5 million received from sale of Appleton Papers Division.

NCR's computer systems' revenue growth last year outpaced the other NCR areas -- 18% followed by 12.8% in financial terminals and systems; 11% in general purpose terminals and systems, and 8% in retail terminals and systems. With this growth, computer systems are gaining on the contributions of terminals to the $1.562 billion cited as equipment sales and rentals, but still don't have the lion's share. Terminals contributed over 52% of these revenues while computers totaled over 44% (up from 41% in 1977).

The glamor of fast growth has a price, as DEC is learning. In the past, DEC has endorsed what EDP/IR might dub the "octopus" method of organization, with various elements having their own decentralized support staffs. Last year there was some resemblance of reorganization (EDP/IR, June 26) with three principal groups reporting to a four-man office of the president. Perhaps the objective is to facilitate improving the earnings/revenue ratio. For the calendar year, DEC's earnings grew 20% but revenues grew 27%, reflecting a quarter in which earnings grew 17% but revenues rose 40%.

And IBM has been spending money to "build up its resources." Its earnings grew at a lower percentage rate than revenues -- both for 1978 and the first quarter 1979. IBM is constructing two new plants in Charlotte, N.C., and Tucson, Ariz., (a total of 1.6 million square feet) and is also increasing capacity at 26 other plants worldwide. In addition, during 1978 and 1977 it added about 14,000 employees to its worldwide manufacturing operations. Looks like the Giant has been gearing up for a heavy duty delivery schedule. We'll see how heavy when word of the 4300 deliveries is released.

Honeywell's information systems segment's contributions to earnings of the corporation continued climbing from its low of 18.5% in 1976 and reached 27.3% in 1978. Earnings from the segment grew 34% during 1978 to $106 million compared with a 24.7% gain in revenues totaling $1.294 billion.

Univac contributed nearly 50% (49.4%) of Sperry's earnings for the year ended March 1978, the highest percentage since at least 1974. Since 1974, Univac's contribution has been alternating between 44% and 47.6%. Between 1977 and 1978, Univac's earnings outstripped revenue growth 26% to 18% -- nearly the same ratio as for the entire Sperry corporation.

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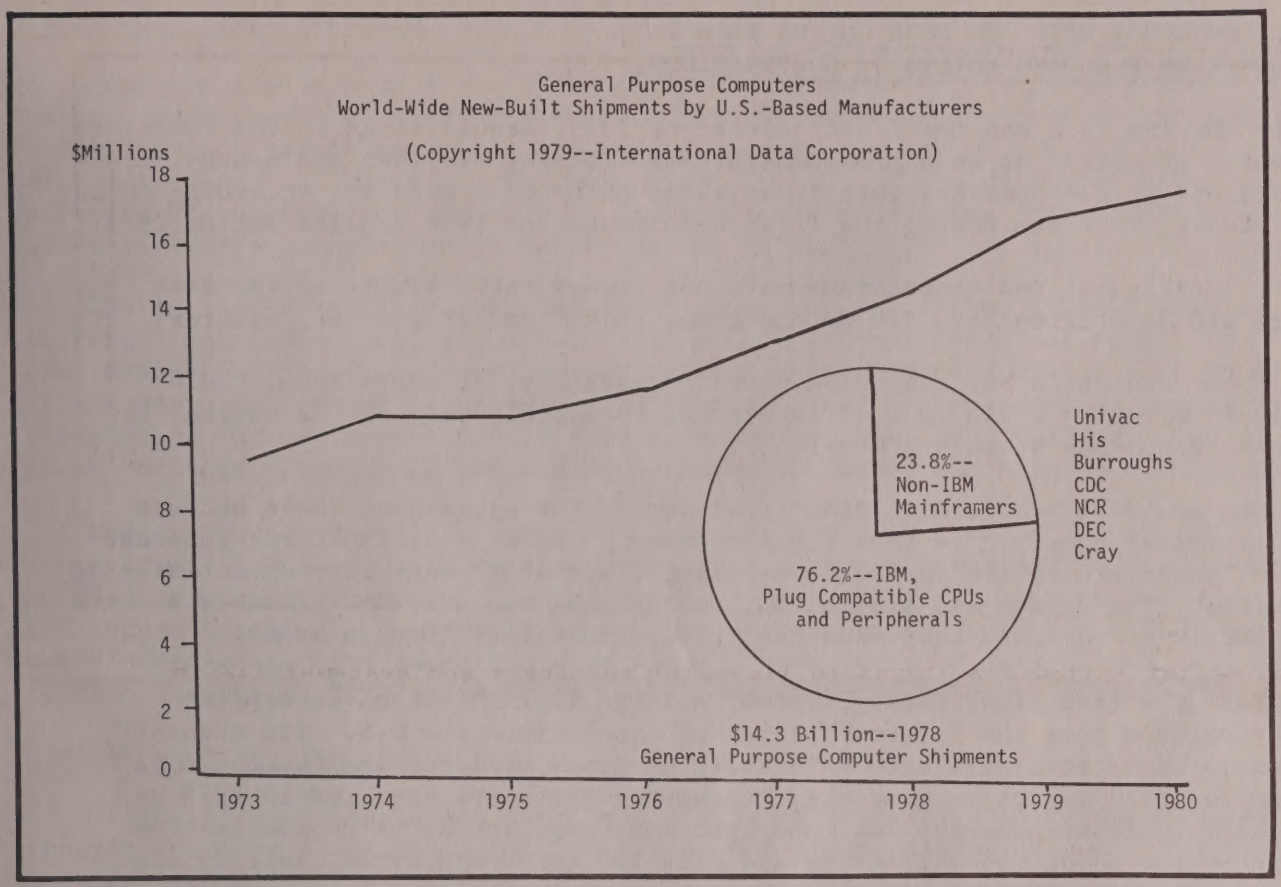

Why the trend to purchases?

Why the trend to purchases? Users are more sophisticated and consider DP equipment as capital expenditures and also are able to plan in advance for these major outlays. The higher ratio of purchased gear frees vendors of the worry about obsoleting their revenue base. Thus we should expect to see a quicker pace of new product introductions. IBM's DP equipment sales as a percentage of revenues are rising -- from 19.6% in 1974 to 27.7% in 1978.

From whence cometh future revenues?

Despite the faster growth in revenues from outright sales for the group, EDP/IR suspects there will in time be more similarity in the two growth rates as mainframers recall the virtues of providing blades -- alias software/firmware and service -- as well as razors. A glimpse of the future from IBM? Although the Giant's rentals and services (R&S) on both DP equipment and on services, program products and supplies are falling -- 60% in 1974 to 50.8% in 1978, revenue from R&S on services, program products and supplies are rising -- 6.9% to 9.9%. And these figures don't reflect the recent pricing moves.

Shipments in high gear

IDC figures show worldwide new shipments of general purpose computers by U.S. makers is in high gear for the three years 1977 through 1979, with annual increases in dollar volume averaging 15%. However, in the future, it is unlikely similar increases will be sustained, considering the growing size of the base. The graph above depicts the various rates of growth in shipments.

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'HOW YOU GONNA KEEP 'EM DOWN ON THE FARM'? IS QUESTION PLAGUING BUYERS OF CORPORATIONS

Fact: During 1978 and the first quarter of 1979, acquisitions in the computer industry proceeded at an unprecedented pace. During the last ten months, acquisitions in the industry totaled at least 80 by 60 companies, according to an IDC study. The rate during the first nine months of 1978 equaled all of 1977.

Fact: Management and technicians have not always taken kindly to the take overs and have often left "to do their own thing" or for greener pastures.

Money can still buy companies, but increasingly, it would seem, the would-be acquirer would do well to discuss thoroughly with the "acquiree" the general consensus of such a move.

One would-be acquisition didn't get beyond the bargaining table because the potential acquirer -- thus far anonymous -- made it plain it was interested in Tymshare only if Tymshare's management and staff were interested in being acquired. The answer was a blunt no, so the deal was off, and probably all are better off because they made their positions clear to each other.

Take the case of Northern Telecom, a large ($1.5 billion) enterprise sweeping down from the Northern plains of Canada into the U.S. Its acquisitions in the states have been relatively numerous of late, and there are no signs that the empire is complete. Among the companies acquired in 1978 by Northern Telecom: Danray, Inc. and Spectron Corp. in the telecommunications arena -- for about $46 million -- and Data 100 Corp. and Sycor, Inc. in the data processing systems arena -- for about $230 million. Both companies offered Northern Telecom the chance to acquire a sizeable lease base, thus insuring some modicum of inward cash flow over the years.

Although Northern Telecom is no newcomer to the game of acquisitions -- spending nearly $350 million in corporate acquisitions in the last decade -- it now finds itself without a tier of management that was in place when it acquired Data 100 in Minnesota and its Michigan neighbor, Sycor. Managing acquisitions is not known to be easy, especially when, as in these cases, both were still run by their founders, Messrs. Orenstein at Data 100 and Irwin at Sycor. But they were soon out the door, either voluntarily or not, and undoubtedly counting their cash and/or stock from their years of toil.

But if making one acquisition can be tricky, making two can be trickier. Judging from who is left running the show, a Northern Telecom man, oddly enough, Sycor and Data 100 management got miffed when someone from the neighboring camp was put in higher spots, and the exodus began as hopes for climbing up the Northern Telecom ladder appeared dashed. Thus, Northern Telecom has the beginnings of a U.S. empire in the "office systems" arena, but seems a bit short of native management talent that know the companies well.

And word has it that Billings Computer, the recent buyer of California Computer Products Corp.'s floppy disk business, cancelled plans to transfer manufacturing to Utah when it found key talent unwilling to leave Southern California. Billings now plans to find a plant in the Orange County area.

After Quantor's acquisition by NCR, there were lots of ads in local Sunday papers seeking people. Expansion? Perhaps. Exodus? More likely.

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Users not always ecstatic

Supplier A gets bought out by supplier B, who happens to be a very much larger company with more cash reserves. Are the users secure in their beds at night knowing they'll be well cared for because of the larger company's additional strengths? Hardly. In fact, judging from a group of Comten users surveyed by International Data Corp., some of them were losing sleep over concerns of future Comten support and technical strength.

Comten, maker of IBM-compatible front ends, made headlines briefly when A) it turned down an acquisition offer from an unidentified party not really in the computer business (loosely paraphrased); B) NCR announced it was that party and had an agreement in principle to take over Comten for cash; C) Amdahl revealed it too was interested in acquiring Comten, and upped NCR's ante in a stock exchange rate; D) it chose NCR, because "The Cash" was bidding hard cash.

Users, though, weren't all smiles. And NCR has done nothing to dispel their dismay. NCR has merely said Comten will be operated as a subsidiary.(?) No word on whether Comten will continue to do business as it has, or whether its technological IBM-compatible know-how will be consumed perhaps in NCR-compatible projects. Instances could be the EFT mart, or some sort of NCR scheme to link its myriad POS terminals to, who knows, IBM-type CPUs perchance?

Capital will be nice, but

Of the 15 users surveyed, there was nearly an even split between those who thought they would and would not benefit by NCR's acquisition of Comten. The principal benefit seen would be additional capital and possibly better service. At least four felt there would be a degradation in hardware delivery and software development. When apprised of historical trends of key people leaving acquired companies, nearly all agreed that a similar event would definitely create a problem for them. None felt Comten has sufficient technical manpower resources to be able to divert people to work in the area of NCR-compatible equipment. In fact, some indicated they perceive Comten as being understaffed to handle its current level of business.

The question of whether Comten's strength in innovative work on IBM compatible data communications software would be stifled by the NCR acquisition drew mixed comments. Users' remarks make it clear they don't feel Comten could be strong in both areas. Comten "will have to throw all its manpower to emulate NCR. It can keep up with the 4300s now but nothing else." "I think (stifling Comten's IBM-compatible strength) would be very foolish. That's where they've made their mark. Why blow it." "If upper management is smart they'll increase, not stifle."

One user was willing to give Comten a year before appraising the improved or degraded quality of its offerings, while another, not an NCR fan, forthrightly said he would axe his Comten gear if NCR took over.

Users' vulnerability depends on the degree of involvement with Comten. One user indicated his company is "almost pioneering things with Comten and if their key technical people leave, we're in big trouble." Another said, "the people involved designed our system. We would lose all the support we're used to getting (if they left)." However, there was at least one who indicated his people were competent in the Comten area so he felt self sufficient.

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• IBM'S BID FOR DIRECTED VERDICT FAILS in the Transamerica vs. IBM antitrust case, so attorneys for IBM will again get a chance to go through their paces in presenting IBM's case. But fear not, the law firm of O'Melveny & Myers is getting well paid for its efforts. O'Melveny & Myers, which also represented IBM in the Memorex case last year, received $7.6 million in fees from IBM during 1978. That amount is a mere pittance compared with the $25.4 million IBM paid du Pont and the $9.7 million to Corning last year. The figures came to light in IBM's proxy statement because representatives from these firms sit on IBM's board of directors.

• AT&T'S LATEST PBX LOOKS LIKE IT'S USER-PROGRAMMABLE, which doesn't help clarify the fuzzy line between DP and communications. The newest Dimension PBX Retail System "allows the customer to make changes in the system without telephone company involvement" and is "accessed by a CRT terminal using a high-level command language," AT&T said. More than 750 Dimension Retail systems have been installed, and the new version is available in June.

• SPECIALIZED COMMON CARRIERS' RATES FALLING. The Federal Communications Commission okayed a tariff agreement that allows the independents use of Bell's local loops at 33% to 80% higher rates than Bell charges its own customers -- far less than the 300% higher rates Bell had proposed. So MCI Communications Inc., Southern Pacific and ITT should be able to offer their long distance services (that need local loops to hook onto their facilities) at appealing rates. . . . And packet-switcher Telenet plans to introduce lower rates for use of its net during nights and weekends. The tariff filed with the FCC requests rates of 75 cent/hr, which includes connect time plus up to two kilopackets of traffic. But there's a minimum charge of $7,500 for each subscriber organization. Telenet expects the rate will stimulate growth of services aimed at the home and student market.

• IT'S SPRING, AND THE MAYPOLE DANCE THEME IS MORE FOR LESS. Control Data's four models of the new version of the Cyber 170 line replace the previous six models with performance improvements about 60% for about 3% to 15% less cost, the company said. All models are field-upgradeable. The two top models have a functional CPU that includes nine phased arithmetic units that operate independently, allowing more than one operation at a time per unit. And prices of additional (4K) memory are between 20% to 53% less than previously. Prices for the new Cybers range from $460,950 to $3.5 million. . . . Basic Four's reconfigured basic System 610 small business computer has 32K instead of 8K for the same price -- $51,400. . . . DEC has endowed its Decsystem-20 with semiconductor memory, thus providing a 6 Mbyte limit instead of 2M byte on the 2040 and 2060, but there's no price break. 1M of MOS costs $65K.

• HEWLETT-PACKARD HAS JAZZED UP its System 45 desktop computer with more than a seven-fold increase in memory, a price cut of over 50% in additional memory -- now 4 cent/byte -- and changes in the operating system. The 45B can have up to 449K bytes. A basic 45B with processor, keyboard, tape cassette, 56K memory and CRT costs $12,500. The 45A can be upgraded to the 45B, which accepts HP's 2631G graphics printer and the 7925, a 120 Mbyte disk.

• INCOTERM LANDS BIG PACT FROM UNITED for 10,000 terminals over the next four years for use by travel agents and its own reservations people. The initial release of equipment is worth $6.8 million.

EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" APRIL 9, 1979 • VOL.14,NO.21 P.J. McGOVERN,PUBLISHER

The 4300s vs the rest of the gang -- Page 4

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1979'S CROP OF COMPUTERS SPORT PRICES ABOUT 30% BELOW 1978'S MODELS

Like lemmings flocking to the sea, computer vendors are rushing to announce new models with lower prices in order to conform with the price/performance range established by IBM with its 4300s. The introduction of the 4300 in January served notice to the rest of the community that IBM apparently had folded its umbrella in order to engage in some serious competition.

Within the last three months, all mainframers not in the IBM plug compatible field except Univac and DEC added models with prices about 30% below their existing line. Blue Bell may join this month. The PCMs marketing to end users, Magnuson, Control Data and Itel, added new models and/or cut prices of their existing CPUs.

This round consists primarily of enhancements to existing architectures and techniques. The Burroughs, NCR and Honeywell systems are software-compatible with previous models. Burroughs has expanded and enhanced its modular CPU and Data Link concepts; NCR is emphasizing transaction processing capabilities; and Honeywell added a Query Driven System that uses English-like statements. Among the trends appearing:

- Modular architecture with microprocessors handling various tasks and more integrated controllers.
- Greater availability of short term lease plans. CDC is now offering its own leases -- one and three year terms -- for the Omega line.
- Different pricing structures for software. Burroughs gathered together the various products users need and charges a flat $700/mo, which it says is usually less than previous fees paid.
- Wider use of remote diagnostics and other attempts to bring hardware maintenance costs into line with those of IBM.
- More emphasis on linking of multiple processors -- even among different systems within a product line.

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Product overview

- Burroughs is touting "micro-modular, concurrent," building block architecture with its first models of its 900 series -- B 2930 and B 3950. The CPUs contain an army of microprocessors that handle I/O overhead and also independent processing modules that function concurrently.

- NCR's new V85X5s succeed the V-8500 models and sport the ability to become multiple processor systems with other members of the family. They also feature parallel multi-tasking techniques -- an aid in transaction processing environments. The bus architecture systems feature a Bit Serial Link that can transfer data in a serial bit stream at 16 Mbit/sec. NCR managed to bracket IBM's prices.

- Honeywell is countering the 4300s with two smaller Level 66s -- Distributed Processing System (DPS)-440, -520 -- and two Level 64s priced below the previous bottom of the line -- DPS-320, 350. The Level 64s have an integrated communications controller that handles up to 14 lines. An integrated storage controller can handle up to 1,600 Mbytes of disk. The Level 66s feature a new Datanet 6641 front end processor and system console and the CPU is aided by a system control unit. All new systems can serve in networks with Level 6s as they support the Distributed Systems Environment (DSE).

- Magnuson is peddling current delivery on its /3 and /4 processors, with promises of upgrades to the /32, /42 and /43 a few months after IBM makes deliveries and it can create its own comparable microcode. Prices were slashed on the /3 and /4.

- Itel condensed its line of AS systems by taking out of production all but the 7031 and AS/5-3, which features an accelerator-type device to the previous product.

- CDC enlarged its line of Omegas with the 480-III and cut prices on the -I and -II (35%, 39% on 512K-I and 2M -II). It also is handling its own leases.

- Amdahl, while not in this sandbox, is nonetheless affected by the 4300 and is starting to provide leases -- some short term -- for its systems(EDP/IR,March 23).

Savings shouted

In addition to ranking their systems vis a vis the 4300s, vendors are touting the price reductions of CPUs compared with previous models in their line -- up to 36%. And take a look at the new levels of price/performance. NCR's V-8585M offers over 65% greater power at 20% less price than the V-8580; Burroughs' 2930 is twice as powerful as the B2835 for an additional $5,000 or 3.7% The vendors are game despite the lack of IBM's umbrella.

But we all know the revenues have to come from somewhere. Memory is no longer a source of such high profit, what with IBM's $15,000/Mbyte. Hardware maintenance costs have taken a tumble downward, again following the lead of IBM. There doesn't appear to be much fat in the prices of the CPU itself, so where's the gravy? In the software, somewhere. And microcode represents the

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Features / CPU	Purchase ($)	Lease ($) (+ Maint.) Mo	Lease ($) (+ Maint.) Year	Term (Years)	Hardware Maintenance ($) Mo	Hardware Maintenance ($) Year	Year's Maint. as % of Purchase	Remote Diag-nostics	MP Ability	$/Mbyte
IBM										
4331	68,760	1,679	20,148	2	171.50	2,058	3.0	Yes		15,000
4341	248,760	6,069	72,828	2	496.50	5,958	2.4	Yes		15,000
Burroughs										
B2930	140,000	4,250	51,000	1	320	3,840	2.7	Yes	Yes (4)	15,000
B3950	230,000	7,200	86,400	1	500	6,000	2.6	Yes	Yes (4)	15,000
NCR										
V8455	50,180	1,330	15,960	3	137	1,644	3.3	Yes	No	20,000
V8555M	88,035	2,363	28,356	3	190	2,280	2.6	Yes	Yes (4)	20,000
V8575M	225.300	5,884	70,608	3	520	6,240	2.8	Yes	Yes (4)	20,000
V8585M	375,000	9,792	117,504	3	865	10,380	2.8	Yes	Yes (4)	20,000
HIS										
64-320	81,360	2,061	24,732	5	516	6,192	7.6	Yes		23,680
64-350	155,232	3,800	45,600	5	760	9,120	5.8	Yes		23,680
66-440	265,397	6,114	73,368	5	1,123	13,476	5.9			23,680
66-520	416,066	8,961	107,532	5	1,788	21,456	5.2			23,680
Univac										
90/30*	147,960	3,584	43,008	5	676	8,112	5.5			
90/30	217,080	6,571	78,852	5	896	10,752	5			
1100-11	850,500	18,500	222,000	5	4,325	51,900	6.1			
Magnuson**										
M80/3	180,000	No			1,275	15,300	8.5	Yes	No	15,000
M80/4	295,000	9,520	114,240	2	2,350	28,200	9.6	Yes	No	15,000
Itel										
AS3-5	600,000	No			NA			Yes	No	75,000
CDC										
Omega 480-I	188,000	8,527	102,324	1	1,320	15,840	8.4	Yes		30,000
"		7,587	91,044	3						
Omega 480-II	309,000	14,010	168,120	1	2,165	25,980	8.4	Yes		30,000
"		12,465	149,580	3						
-- --										
IBM										
370/138	233,760	9,054	108,648	4	1,305	15,660	6.7		No	75,000
370/148	525,300	21,084	253,008	4	2,434	29,208	5.6		No	75,000

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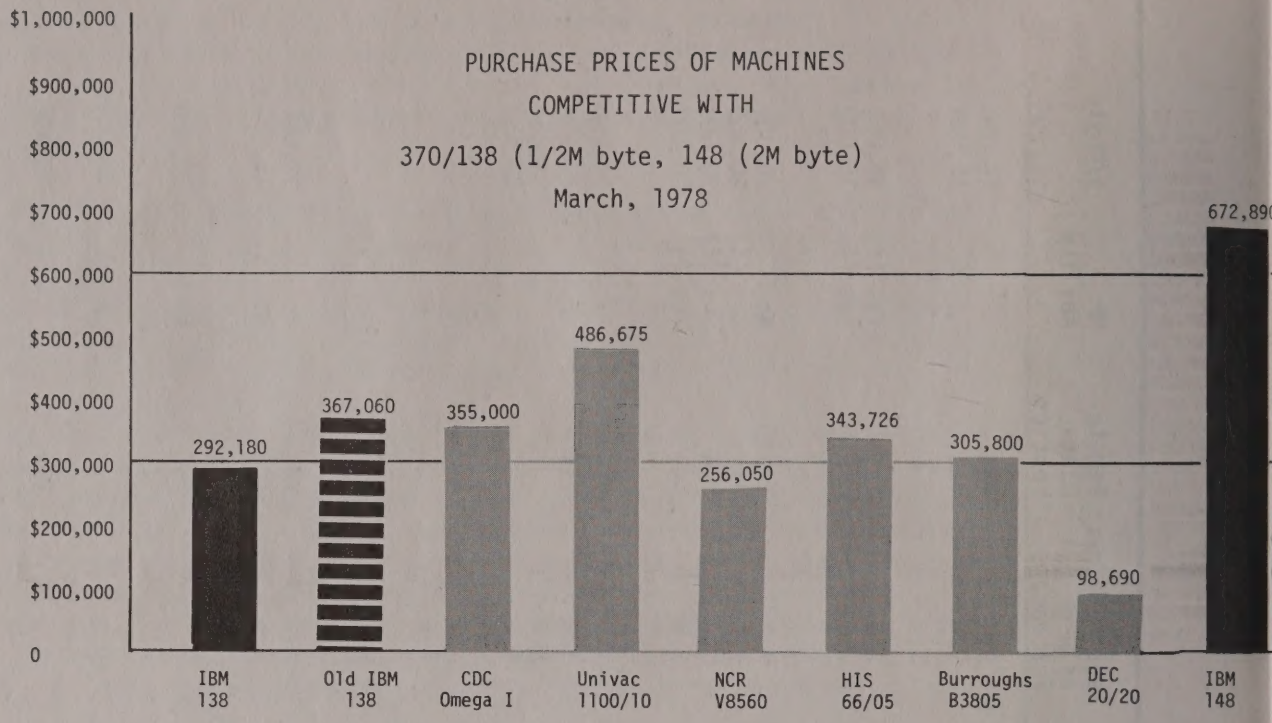

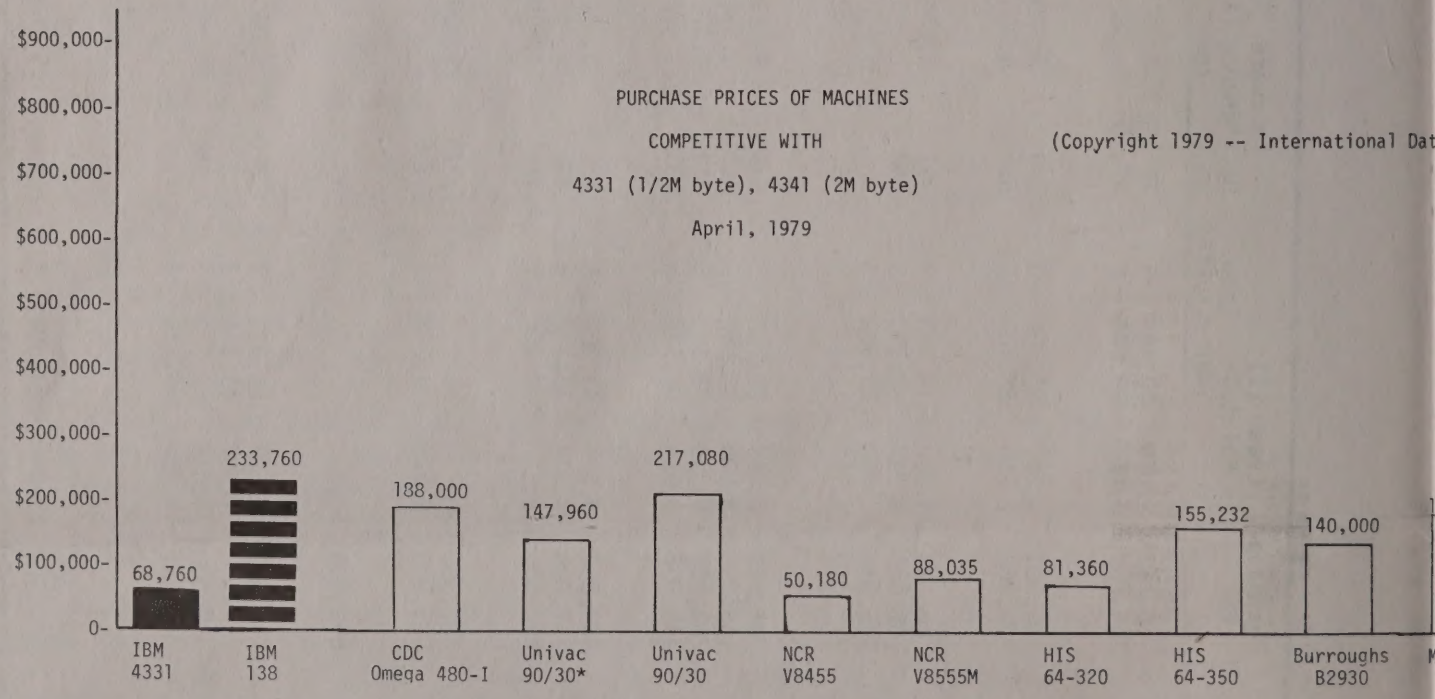

All prices are for CPU, memory, console and power supply. IBM compares 4300s with the 370/115 and /138, but at the same time indicates their power is in the range of the 138 and above that of the 148. The top chart (March, 1978), shows the downward pricing trend. Many PCMs see lack of prompt 4300 deliveries as a factor in their favor and apparently are pricing their offerings vs. the 148, 138 rather than vs. the 4300s. Current 138, 148 prices are for comparison. The charts do not consider performance factors.

* Price of a 262K 90/30; Univac feels this is sufficient vs. a 512K 4331.

**Price of 4300-type machines from Magnuson (upgrades from /3 and /4) are:

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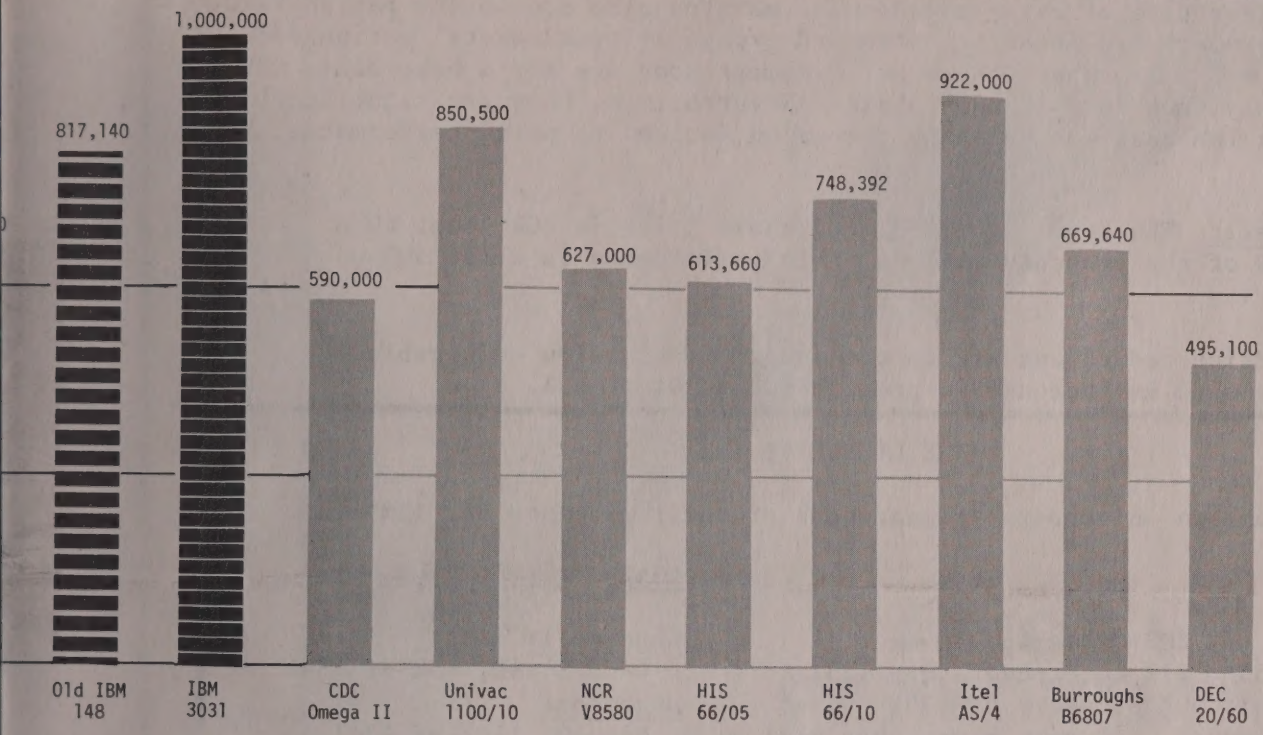

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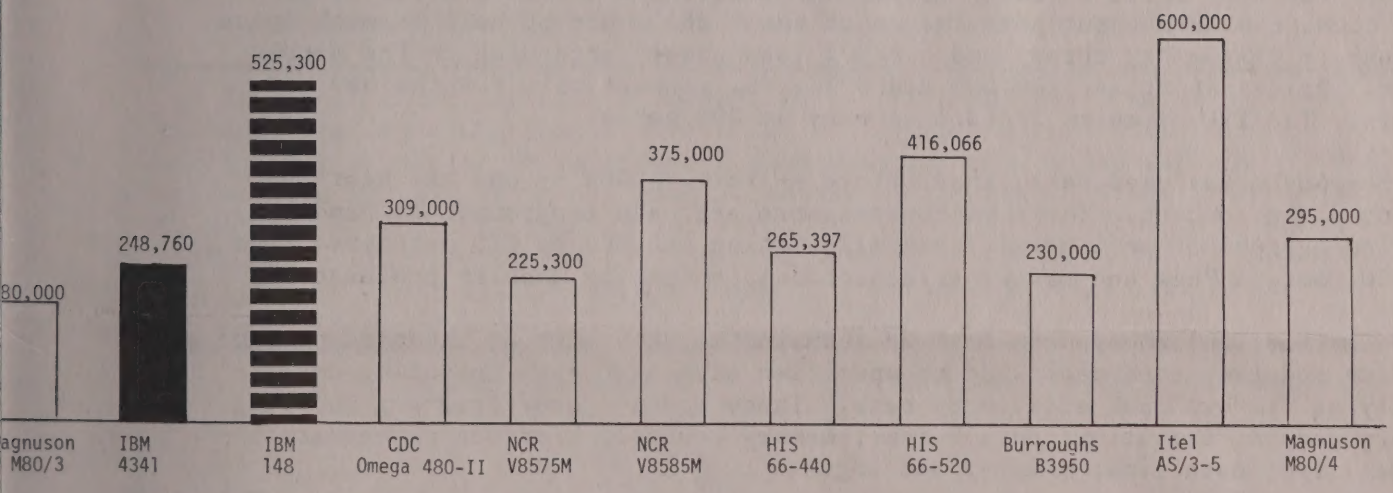

/32, $185,000; /42, $275,000; /43, $315,000.

Digital Equipment declined to proffer systems, citing lack of 4300 benchmarks. In an interactive environment, DEC said it might bid 11/34 to 11/70.

Most vendors' maintenance on purchased and leased machines includes nine hours a day, five days a week, between certain daytime hours. IBM now bases its 4300 maintenance charges for rental, lease and purchase systems on the above scheme; users pay 39% of the base rate for 24 hour/day, 7 day/week coverage. But with the advent of remote diagnostics and the 24 hour/day consultation service, there should not be as much need for on-site help.

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primary future source of value-added. The margins also are in the peripherals. Will the government I/O interface standard expose systems makers' peripherals to competition? Remember, these price comparisons are for a bare bones CPU and memory only, not on a systems basis. Nevertheless, they are significant and show that IBM does not have the corner on increasing price/performance.

- Honeywell: The Level 64 DPS-320 purchase price is 30% lower than the CPU of the present Level 64 while performance is about 50% greater.

- NCR: Price reductions are in the range of 36% below comparable V-8500s with an increase in power between 30% to 45%.

THE LINEUP VS IBM

Here's a rundown on vendors' comparisons of their machines vs. IBM's.

4331	4341
Honeywell: 64 DPS-320 = 4331	Honeywell:
NCR: V-8555M, 47% more power than 4331	66 DPS 440, 75% of 4341
V-8455, 90% of power of 4331	Magnuson:
Magnuson: M80/3, 50% more power than 4331	M80/42, 110% of 4341
M80/32, 300% of power of 4331	M80/43, 130% of the 4341

Burroughs takes modularity a step further

Burroughs traditionally has been the implementer of new technology, so perhaps the 900s merit a closer look. The B 2930 and B 3950 provide up to five times the throughput performance of the B 2835, occupy half as much space (thanks to 16K memory chips) and use 50% less power, according to the Motown maker. Prices start at $140,000 and $230,000, respectively for the new models. The TTL circuits contain as many as 800 gates.

Burroughs has used data links before -- in the 800s -- and has kept and improved the concept. These microprocessors are each programmed to handle a particular type of peripheral, thus alleviating the CPU of I/O overhead. The B 2930 touts a "new and faster asynchronously operating modular processor."

The modular concept can best be seen in the structure of independent processing modules, each dedicated to specified steps and each operating concurrently at its own peak efficiency rate. These modules are: program; control; memory access; execution; data buffer; memory control. Various processors include: I/O; data link; memory; and logic.

By collecting into one package the commonly used software, Burroughs estimates users will spend less compared with the previous practice of paying for individual software elements. The basic Software Facilities Program ($700/mo) includes a Master Control Program (MCP VI), an enhanced Burroughs Network Definition Language; a Generalized Message Control System and a compiler for RPG II, Cobol, Fortran or Basic. Options include: Workflow Management System ($50/mo), and an inquiry system ($50/mo).

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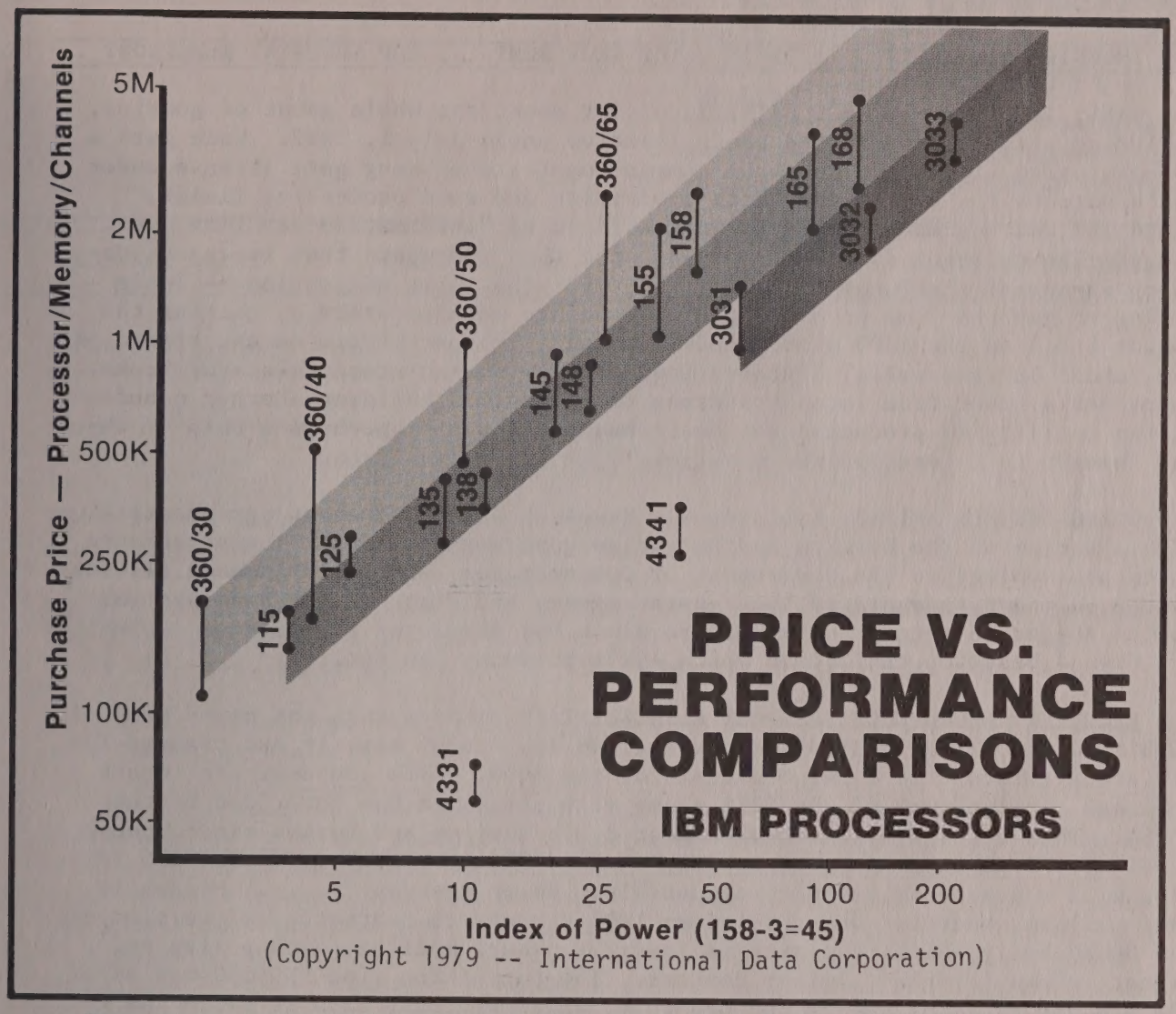
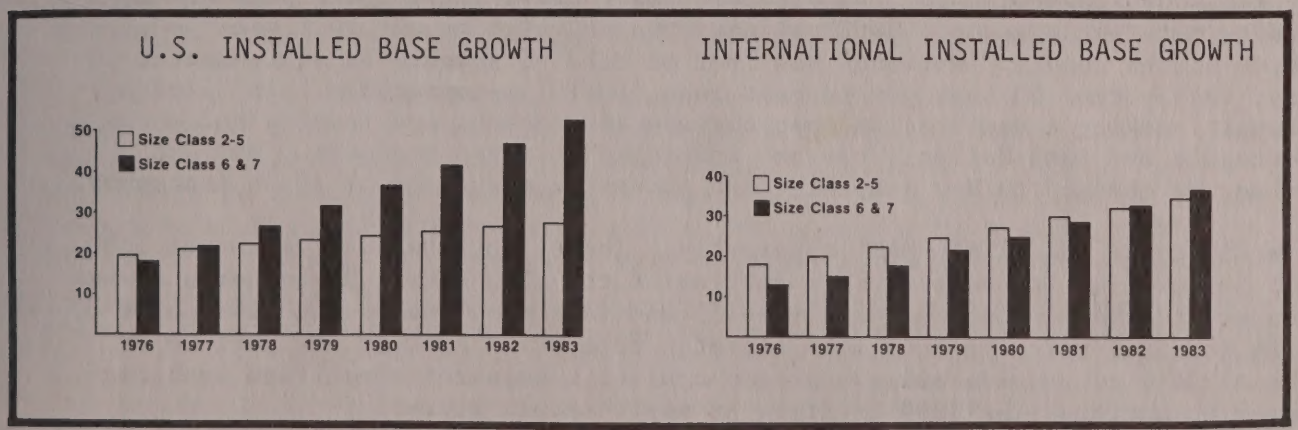


The above chart depicts the magnitude of the price/performance improvements in the IBM 4300s compared with the 370 line. As indicated on pages 4 and 5, most of the other mainframers have managed to also improve their price/performance ratios. With the elastic nature of the computer mart, the growth in markets of IDC size classes two through five should continue at a moderate rate, as illustrated by the chart below, despite the price cuts. Size class two includes those systems in the range of the IBM System/3; Size class five is that of the 148.



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• WANG, IBM CROSS-LICENSE PATENTS on just about the whole gamut of goodies, including present patents and those filed up until July 1, 1982. Each gets a non-exclusive license. The terse announcement states Wang gets license under IBM's patents for use in the "data processing and word processing fields," while IBM can use Wang's patents in the field of "information-handling systems." The question is: what has Wang got that IBM wants that it cannot develop in-house? And what will Wang take from the table of goodies -- is it trying to get the jump on other plug-compatible manufacturers by getting the inside track on the 4300's microcode? Or will it concentrate on the office of the future paraphernalia? Interestingly, a few weeks before this news broke, there was a rumor from local tradesmen that Wang was building another manufacturing facility to produce a device it had developed -- perhaps a chip -- which was thought to be used in the E series.

• GOING FURTHER AFIELD, Applied Data Research has procurement agreements with agencies of the Russian and Bulgarian governments. Under the agreements, which are subject to the Department of Commerce nod, ADR would license all its system software products to the Russian agency and eight of its nine systems to the Bulgarian agency. The Eastern block has developed a series of computers (Ryad) based on the 360 on which ADR's products can run.

• EIGHT-BIT MICROPROCESSORS GET A FACELIFT to compete with the newer crop of 16-bit micros (Zilog's Z8000 is now available). Intel says it has crammed 16-bit architecture into a new 8-bit micro, the 8088, which contains the 16-bit internal architecture of the 8086 along with the 8-bit bus interface of the 8085A. Thus it is compatible with most 8-bit designs and boasts minicomputer level of CPU performance, boasts Intel. The 8088 is a member of the 8086 family, with which it is software compatible. No prices yet. . . . Meanwhile, National Semiconductor has applied an XMOS process to fabricate its version of the 8048 family which it claims is lower in power, smaller in chip size and higher in density than similar devices. The-top-of-the line INS8050 has 4K of ROM and 256 bytes of RAM on the CPU chip, which National says is twice the capacity of a similar single chip micro on the market. No identifiable prices.

• NATIONAL RETHINKS COMPUTER SYSTEMS BUSINESS GAME PLAN, or so it would seem. Remember the System/400, an IBM-compatible CPU whose shiny box was featured at the NCC in June? Well, it still hasn't appeared yet although originally due in April. National insists it hasn't jettisoned the idea but is planning how to position the 400 in the market, which was considerably changed by the 4300 announcement. Two alternatives include cutting the price or adding more performance. National says the 400 will be out in fiscal '80, which starts June 1. National has "put on hold" its would-be minicomputer entry, the System/200 that was to have been PDP-11/34-compatible. It filed a lawsuit seeking a declaration that certain DEC patents are invalid and unenforceable and that National had not infringed on those products. But the venue was changed to New Hampshire and things have dragged on since September.

• GSD LIKES THE RETAIL MART apparently. The Atlanta-based division of IBM has followed up its January introduction of the 5260 Retail System with a wand reader attachment (not the wand itself) and four versions of the 5265 point of sale terminal which include more diskette capacity. Another new feature is the ability to provide sales and cash control totals for simplified cash register balancing. The 5260 is aimed at small retail stores.

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EDP industry report

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"THE GRAY SHEET" MARCH 23, 1979 • VOL.14,NO.20 P.J.McGOVERN,PUBLISHER

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WHEN WILL IBM UNVEIL FULL-FLEDGED RELATIONAL DATA BASE MANAGEMENT SYSTEM?

IBM has been working on at least one version of a relational data base management system (DBMS), dubbed System R. The question arises: when will a full-fledged relational DBMS be announced? Will it be System R? With the proliferation of DBMS as users want their systems to be easier to use and to do more for them, how does one get one type of DBMS to communicate with another? These were two issues raised at the IEEE Computer Society's recent meeting.

(IBM has shown some of its thinking on DBMS with the System/38's integration of a DBMS into the CPU.)

EDP/IR's hunch is that unfortunately we won't see System R as it is today introduced in toto as a product. Rather, aspects of it will appear in various offerings. A recent flurry in the user community has arisen from a prediction that IBM will cease support of IMS and introduce a relational scheme. Although IBM indeed may put some type of relational DBMS on its future series, there may be a means by which users can transfer their data from an IMS system into a relational system. However, it remains to be seen whether such a conversion bridge will come from IBM or an enterprising independent.

There are workable methods of facilitating communication between network and relational type data base systems, according to George Champine, director of advanced systems at Univac. In fact, there is a mechanized translator that allows the translation of schemata between network and relational systems, he said. At the logical level, there is almost a one to one mapping between features in the two types of systems. Algorithms are translated at the data definition and data manipulation levels and the translating mechanism maps on the storage or superimposes constructs from one model onto constructs of the other.

Jim Gray from IBM's San Jose research laboratory spoke on behalf of a large team of IBMers who developed System R, a relational DBMS. Gray stressed the system is experimental and not a product, but said it is likely that aspects will be embodied in future offerings. One of the parameters in the development of R was that it coexist with existing operating systems -- VM and MVS on 370. Thus it is conceivable that a future R could be more efficient in

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its dealings with different systems code. Also, the group that developed R is looking at parallel processors for R, he said.

Ease of use was the design objective of System R, which has been operational since mid 1977. R uses a nonprocedural language called Sequel (SQL), a unified data descriptor and data manipulation language. Taking the description of the data as the data base, R embodies an integrated data dictionary with all data organized into tables that can be read and altered using SQL. SQL is a high level language with statements such as "Select name, job from employee where office = 'Paris'.

Query capability

A query capability is offered via a host language interface called the User-Friendly Interface (UFI), which serves as a front end. UFI is basically an interpreter. There is a compile feature that can give performance comparable to that obtained with IMS. But with SQL statements, which involve several operational steps, Gray said "all bets (on performance) are off."

UFI permits the query capability to be implemented as an application program. Thus data can be accessed and updated "both through the UFI (by interactively issuing SQL statements) and by application programs written in host languages such as Cobol and PL/1," Gray said. But R goes one step further and facilitates compile time optimization of the data base services by extending Cobol and PL/1 to permit SQL statements to be imbedded in an application program. Gray explained that since the "SQL statement is an integral part of the application program (and not a parameter of a CALL), it is possible to perform early binding (compilation) and thus enhance performance."

Thus System R in effect is a compiler of data manipulation statements -- "it compiles statements in the SQL language into machine code which issues calls to the access method." Furthermore, the cost of supporting the very high level language SQL is paid at compile time rather than at run time. Thus if the query is used several times, the one-time cost is amortized over many uses. How does this work? A System R preprocessor finds the SQL statements and hands them over to the "System R parser, optimizer and code generator, which produce object code containing calls to a relational access method. The PL1/SQL program is then translated into a pure PL/1 program containing calls to this object code," Gray explained.

Optimizer feature

And there's an optimizer that determines wich access paths to use to evaluate a SQL statement. The optimal plan minimizes the cost of execution in terms of instructions and I/O operations; this plan is given to the code generator which creates a machine language program to execute the plan, Gray said. The optimizer prevents the user from having to know anything about storage details and also prohibits him from "taking advantage" of knowledge of such details, "thereby permitting system optimization as the underlying storage structures evolve with time."

Other features that enhance functionality are the ability to specify that certain records be clustered together in physical media, which is transparent to the application program, and the recompilation of application programs to reflect changes in access paths, table statistics and clustering.

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Decentralized data base administrator

System R lets each user do his own thing. With no centralized administrator, the system is an integrated database with some autonomy among user groups. Nearly all DBA functions are done while the system is operating. In addition, System R supports multiple users concurrently accessing data and has "complete facilities for transaction backout and system recovery." All recovery information is kept on disk and anything short of a catastrophic restart needs no operator action. The backout capability consists of a log so users can know where the system is in order to "undo" partially completed transactions. Completed updates are "redundantly stored in the log so they may be re-applied in case of system or media failures."

What about concurrent usage? System R uses a locking protocol to prevent it from getting confused because of concurrent access to a data item. The locking system also lets the user control to what extent his transaction is isolated from the effects of other transactions. There can also be several versions of R on the same system.

IN THE FINE PRINT: 4300S HAVE SOME LIMITATIONS
CONFIGURABILITY CONSTRICTIONS ESPECIALLY AFFECT THE 4331

"Some I/O devices and features are mutually exclusive." -- IBM 4300 literature

A closer look at the 4300s reveal some limitations in configurability. Many of the limitations occur on the smaller model, the 4331, which appears to be a supermini thinly disguised.

For both systems, 65K of microcode is standard. In many instances, depending on facilities in use, the user would be wise to spend $5,100 and gain another 65K of microcode. The additional control storage can improve systems performance and also increase the amount of memory available to the user. The processor storage available to the user is reduced by at least 16K with the addition of the extension, but reduced by 52K without the extension.

IBM has a "one from column A, and one from column B" procedure to calculate whether the additional control storage is needed on a given system. One interesting tidbit is that ECPS/VSE requires 2K bytes of storage per Mbyte of virtual storage defined for IPL.

How extensive is the microcode throughout the system? Good question, but a hint can be found in IBM's statement: "Because there is a close relationship between the adapter hardware, the attached I/O device(s) and the required microcode, certain I/O adapters must be installed/removed with the related devices, since the system is inoperative with only the adapter installed." This applies to the adapters for disk, the 5424 (96 column card unit) and the 8809 tape drive. Interesting.

231X compatibility but

The 4331 makes a pitch that it allows users to keep their old 231X disks, however, keeping the 231X disks looks to EDP/IR like it might be more trouble than it might be worth. Here are some of the things one cannot use if one attaches a 231X disk to a 4331:

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- A digital data service adapter with speed of 56K bit/sec.
- 3370s or 3340s.
- 8809 tape drive.
- System/3 data import
- Any telecommunications line operating faster than 9,600 bit/sec

Also, the 231X can be emulated for DOS, DOS/VS and DOS/VSE on up to two consecutively addressed storage strings of 3310s. "Data sets in fixed block mode may be intermixed on the same 3310 volume with 231X emulated data sets but may be accessed concurrently only when ECPS/VSE mode is active." The feature may place additional demands on the system, IBM cautions. Furthermore, if two strings of 3310s perform emulation, then the DASD can't handle direct attachment of 3340s.

But IDC pegged the population of 231X and 231X-type disks in use on IBM System/3s, 360s and 370s at yearend 1977 as only 30% of the installed spindle population, so perhaps the mutually exclusive features don't affect that many.

The 4331 cannot use the 571 Mbyte 3370 if either:

- 231X are attached.
- Any telecommunications line operates greater than 9,600 bit/sec.

IBM also stresses the upgrade path from the System/3 product line. In addition to the attachment of certain peripherals, RPG II Release 3 is available on the 4300s. But one notices a limitation on the 4331:

- The 5424 (96 col. card) and the System 3 data import feature are supported only by DOS/VSE. (The data import feature allows 3340 to read data from a 3348.)

Performance measures

IBM gives some further performance parameters for the 4331.

- With ECPS/VSE, 3310 disk, DOS/VSE, the instruction execution rate averages .91 times that of the 370/138 with 3330 disks and DOS/VS Release 34 on a representative batch jobstream that included commercial applications, sort and a scientific program.
- With ECPS/VSE and DOS/VSE, total CPU time was reduced compared with results without use of ECPS/VSE. Specifically there was:
  + No change in scientifically oriented jobs.
  + An average of 6% improvement for a representative batch jobstream.
  + An improvement of up to 20% for a representative data base/data communications workload with BTAM-ES, CICS/VS and DL/1.

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- With ECPS/VSE, the DOS/VSE cuts system overhead in certain environments by taking advantage of the I/O address translation capability of the 4300s.

- With ECPS/VM/370 and VM/370, CPU busy time was reduced 82% for the VM/370 control program compared to results without ECPS/VM370.

4341 -- fewer limitations

The larger model 4341, in addition to its larger (4 Mbyte) storage and 8K cache, provides support under ECPS for OS/VS1 as well as DOS/VSE and VM/370. ECPS/VM/370 is standard on the 4341 and optional on the 4331. On the 4341:

- With ECPS/VM/370 the 4341 reduces VM control program CPU time by between 39% with VM/370 with CMS to 84% with OS/VS1 batch with VM/370 compared with systems that don't have ECPS/VM/370.

STORAGE DETAILS

Sounding a bit like the S/38, the 4331 and 4341 have a one level addressing facility for improved virtual storage control in ECPS/VSE mode. That mode also has channels with virtual storage addressing whereas under the 370 mode the channels have indirect data addressing.

The diskette appears to be the touted common media with the 8100 and General Systems Division products. But in the 4331 mode, the diskette has 1,924 sectors of 128 bytes for a total of 246,272 vs 1,898 sectors and 242,944 bytes for compatibility with other types of systems.

Interestingly, to attach 3370 disks to the 4341, a 3880 controller is required. On the 4331, the large disks can attach directly to the integrated controller. But the extra storage potential is considerable -- 18 billion bytes with each 3880.

Although the industry generally acknowledges IBM is the first to announce thin-film heads, it is clear that the 3370 could have been more powerful through a different design of its dual actuators. Each actuator can only access half the 571 Mbytes and has a separate address on the channel. What IBM basically did was put two of its drives into one unit, one disk maker observed. Each arm has two heads on it, which helps reduce access time.

IBM is pushing the fixed block architecture which it says provides for recording data in permanent pre-formatted 512-byte blocks on the disk and allows independence from specification of tracks and cylinders. "Each block is separately addressable and separately accessible.... User data is mapped, regardless of record size, to one or more blocks on the disk." Data block position sensing is automatic, IBM said.

The 4341 supports a string switch feature that can attach the 3370 to a second 3380 storage director. Thus two CPUs can share a 3370.

Although the design provides reduced power and space requirements, electrical power must be supplied during non-operating periods. The lack of power to internal environmental control circuitry could cause machine malfunction and could result in possible loss of data, IBM cautions.

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- With ECPS/VSE, total CPU time can be reduced by up to 13% compared with the same version of DOS/VSE running in an interactive environment without ECPS/VSE.

- With ECPS/VS1, CPU busy time for the VS1 supervisor can be reduced by up to 7% compared with the same version of VS1 without ECPS/VS1.

IBM gives fair warning to minimakers -- the 4341 has been measured to be up to 3.1 times faster than the 370/148 running the same Fortran job.

MINIMAKERS PERFORM VARIATIONS ON A THEME AND ADD TO PRODUCT LINES IN FLURRY OF ACTIVITY

There has been quite a bit of activity among minimakers at both the top and bottom of their lines. Some predominant themes include capabilities that make the systems easier to use and the use of lower-priced memory. Among those showing activity are: Prime with its pitch to unsophisticated users via a dealer network; DG's multiple enhancements including X.25 and compatibility between CS and Eclipse lines; more powerful micro-based systems from DEC and DG; and Interdata's lower priced supermini.

Prime pitches to unsophisticated users

Armed with Inform, a dictionary-driven data base management system and Info-Basic, supersets of Microdata's Reality's English and Data Basic, Prime has signed up 10 dealers and expects a total of 30 by year end. Prime purchased the software from a Washington state systems house that handles Primes, Devcom. The Inform is an adjunct to Prime's Primos IV operating system, so a user can also run all the standard languages such as Cobol, Fortran etc. and the Prime communications capabilities.

Dealers, many of whom also handle Microdata's Reality and Royale, will offer two systems dubbed the Information 1000, based on the Prime 400 CPU, and the Information 5000, based on the top-of-the-line Prime 750. Maintenance will be performed by Prime. One dealer said conversion of applications from Microdata to Information hardware is easy. The Basic requires recompiling and some changes in procedure language are needed. The price of a typical 1000 system is $93K with 512K and 96 Mbyte disk, 300 line/min printer and four CRTs. A 5000 typically runs $260,000 for 2 Mbytes and a 160 Mbyte disk, a tape drive, printer and four CRTs. The pricetag includes the Inform software and the Inform Basic. This program is aimed at reaching the non-sophisticated user with Prime 400s and is expected to bring Prime 5% to 10% above its original 1979 revenue target. Note this program is distinct from that with the newer 450 which is targeted at systems houses.

Data General makes CS, Eclipse families compatible

In a rash of announcements that include adding word processing capability to its AOS operating system and an X.25 protocol package for its RTOS/RDOS/DOS products, DG now has achieved Cobol program compatibility throughout its line from the CS 20 to the M/600. Programs can be transferred between the CS and Eclipse after a recompile. DG achieved the intersystem compatibility by adding to its Eclipse AOS systems the interactive screen handling capabilities found on the CS and by putting AOS on the entry level Eclipse, the 150, which

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now has maximum memory of 1MB vs. the previous 256KB. The price of 600 nsec memory is less -- $28K/M byte.

With the added capabilities of AOS, including screen handling and "complete virtualization," the price of the AOS language system was raised by $1,500 to $5,500. DG also added a query capability to Infos. The WP and query capability on Infos each cost $1,000 for initial licenses. The X.25 protocol package, available on RDOS and RTOS systems spanning the range from micronova through Eclipse, can eliminate the need for leased lines or for Telenet-type services, DG said. The software, which costs $1,000 for the first system, has been certified compatible by Telenet and Transpac.

DEC, DG add muscle to micros

Micros once were thought of as occupying the lower part of the totem pole because of price and performance. Well, the performance is fast climbing into the mid range. DEC has thrown a microcomputer -- the LSI-11/23 -- into the midrange of its mini offerings. The LSI-11/23 is software compatible with both the LSI-11/2 at the low end and the PDP-11s at the upper end -- it can run the RSX-11M and -11S operating systems previously available only on mid-to-high range PDP 11s -- and has an optional floating point processor chip. Memory capacity of this micro is 256K, or four times that of the LSI-11/2, and it uses the full instruction set of the PDP-11/34. With its ability to run all software developed for the LSI-11 family without modification, it inherits Basic, Fortran IV and Focal capabilities. Speed ranges from two to five times that of previous LSI-11 products. The price? $6,800 to under $1,800, depending on quantity. There is also a rack mountable packaged version, the PDP-11/23, priced at $6,800 to $4,500 depending on volume. First shipments for customer evaluation start in late summer.

Ah yes, DG is also active at the micro level -- two board level computers, based around a new chip, the mN602, that combines Nova 16-bit architecture and instruction set. Its new micronova MP/100 permits packaging of a 64K, 16-bit computer on two boards compared with six boards for previous micronova-based products. The MP/200 extends the performance of the MP/100 into the range of Nova class minis. The two board level families are supported by DOS, a subset of RDOS, and RTOS. Quantity prices range from $56 10, in quantity, for the mN602 microprocessor to $1,014 for an MP/100 to $1,755 for an MP/200.

Perkin-Elmer closes price gap

Inter ... oops, Perkin-Elmer's Computer Systems Division's Model 3220, the first in a new line of 32 bit processors, seems priced to disprove the myth that 32-bit machines have to cost more. With 1 Mbyte of memory, the price tag for the CPU is $59,000. Later this year the system will be able to take 4 Mbytes. The 3220 incorporates new instructions and performance facilities and is designed for scientific number crunching etc. PE says the 3220's performance of Fortran applications rivals that of DEC's VAX 11/780.

Harris adds APL capability

Harris is targeting service bureau customers that use APL with its APL package that includes an S123 system. Entry level price is under $125K. The APL, which Harris says is up to five times more efficient than other recently announced packages, also runs on the S155.

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• NEC THROWS HAT INTO SMALL BUSINESS SYSTEMS RING with a 16K microprocessor, communications-oriented system with from 128K to 512K main memory. The Astra system is field-upgradeable to the high end model with 32 workstations. Among the communications goodies are up to eight lines with 2780, 3780, 3270 and Hasp protocols. The data transfer rate to workstations is 1M bit/sec and the integrated disk controller transfer rate is 1.2 Mbyte/sec. Printers available include the Spinwriter as well as a matrix printer and a new 300- 600 lpm band printer. All components are made by NEC. Disks of Winchester technology range in size from 20- 60 Mbytes. Systems utilities and Basic are bundled with the price of the system. The Ansi 74 Cobol license will cost about $1,000. Seven packages with the standard range of payroll accounts receivable etc. are available. First shipments start in June, with prices ranging from $13,200 to $150,000. Sales will be via dealers with third party maintenance.

• AMDAHL WRITES OWN SHORT-TERM LEASES in a move to meet market demands. The king of the PCMs indicated it is getting requests for two year leases, which it is writing itself because third party lessors like longer terms. The demand for shorter term leases indicates users want to be free to pick and choose if and when IBM's "H" series arrives.

• XEROX PICKS CDC EXEC TO DIRECT INFORMATION PRODUCTS GROUP. Xerox tapped John V. Titsworth for the presidency of the Information Products Group, which consists of: Xerox Business Systems; Diablo Systems; Versatec; and Shugart Associates, all in California. Titsworth was executive vice-president, systems at CDC but has also held that post with peripheral products. Xerox also named a new head of research, development, and engineering -- Dr. George R. White, whose most recent post was as VP, advanced development management within the Reprographic Technology Group.

• DATAPOINT CREATES COMMUNICATIONS DEVELOPMENT CENTER. The Communications Management Products Division intends to establish its own product development center to expand the Infoswitch product line into other areas. The center will work on other voice communications products as well as products that will function in an integrated office environment, Datapoint said.

• SO MUCH FOR PE'S VERTICAL INTEGRATION WITH FLOPPIES. Perkin-Elmer has found a buyer for its floppy business. The prospective buyer is none other than Siemens. PE also purged the names of its former entities, thus more closely identifying the parts to the whole. Interdata is now the Computer Systems Division and Wangco becomes the Memory Products Division.

• WANG PROVIDES PATH FOR IBM MAG CARD USERS with its own mag card reader that transfers text from IBM mag cards to word processing functions on Wang's systems. Purchase price is $3,500. A special six-month rental of $210/mo allows users to convert their mag cards without a long-term investment.

• ALLOWING DIFFERENT WORD PROCESSORS TO TALK with each other is the intent of a box from Telesystems Network, Inc. of Chicago. The TNI 303 Protocol Translator can handle up to 10 different protocols and various WP systems can communicate via RS 232C interface or hard wire. The first six protocols available include: IBM 6, Vydec, Lanier, Wang, Lexitron and DEC. The translator price of $7,950 includes a choice of three protocols. Each additional protocol costs $350.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" MARCH 12, 1979 • VOL.14,NO.19 P.J.McGOVERN,PUBLISHER

Josephson Junction by 1984

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THE TIMES THEY ARE A-CHANGING -- WITH NEW TECHNOLOGIES IN STORAGE METHODS AND LOGIC

It looks as if the new decade will bring with it a quantum leap in computing power -- thanks both to feats of hardware technology and software efforts, particularly in making computers easier to use. Much of the focus currently lies on the efforts of the semiconductor and other component makers to bring us denser memory and more complex logic on smaller chips that require less power and also generate less power on the chip itself.

The software types meanwhile are increasingly joining hands with the hardware architects to produce such goodies as integrated data base management systems a la IBM's System/38, and perhaps relational data bases. In using the latter, the user need not know anything about where his data is stored, but only has to call it up by content.

Some of the technological tidbits EDP/IR picked up while on a recent trip around about California and at the IEEE Computer Society International Conference (Compcon) in the city by the bay:

- Reliability problems in semiconductor and charge couple device (CCD) technology have not vanished and in fact may require more error correction techniques than are standard in current systems. These include: single bit error correction and rewriting the word in memory as well as "purging" memory periodically.

- Rotating disk technology is at the threshold of major changes in capabilities and probably overall physical size of the drive. With thin film technology in both the head and media, capacities can increase something like 16 times, which should occur by 1985.

- "Far out technologies" are coming, according to their proponents. Josephson Junction will be in commercially available products by 1984, although the products will be targeted at limited sectors of the market. Ovonic memories, or those consisting of amorphous film, should find their way into optical computers as well as some current devices on the market.

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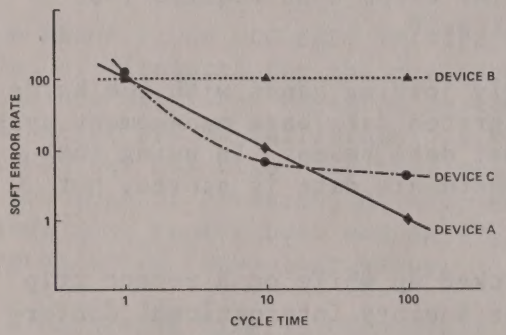
Reliability requires vigilance

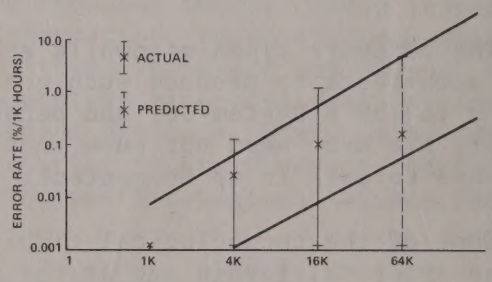
Although it may be true that improved reliability is inherent in products with fewer, denser components, it is also true that unreliability is inherent in aspects of increased density.

For instance, the denser memories, especially dynamic RAMs and charge couple devices (CCD), recently have been found to exhibit "soft errors." These are non-recurring, single-bit errors that evolve in the form of electrical charges created by uranium and thorium impurities imparted from the packaging material of the chip, according to Michael Geilhufe, manager of reliability engineering at Intel Corp.

The soft error rate among dynamic RAMs has increased markedly from the 4K chip level to the 16K chip level, but appears to be stabilizing for 64K devices. The rate of soft failures among 16K RAMs is about 0.1%/1K hours vs. the 4K's .05%/1K hrs, and estimates of 64Ks with today's technology "is not a whole lot better, and the soft error sensitivity of LSI and VLSI will increase," he said.



Soft Error Rate vs Cycle Time for Three Different Dynamic RAMs (Relative Scales)



Measured Soft Error Rates vs Dynamic RAM Densities (Source: Itel)

Present static RAMs are not expected to be sensitive to soft errors in part because of high storage node capacitance, he explained. But denser static RAMs, with smaller storage node capacitance, have shown soft errors and bipolar ICs are also susceptible.

Translating the occurrence of soft errors of 16K RAMs into mean time to failure, he said that a small configuration such as a 16 bit by 64K word system would be 1.75 years. But a 16 Mbyte system would encounter a systems mean time to failure rate of less than four days, certainly an unacceptable rate to systems designers.

Error correction and more

To compensate for the proclivity to soft errors, error correction schemes are needed. Generally, single bit correction and double bit detection is adequate on systems up to 16 Mbytes, but the corrected word must be written back into memory, Geilhufe said. He noted that not all current systems rewrite the word into memory.

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Additionally, systems designers need to build into sizeable systems the capability to periodically "purge" all areas of memory to ensure the contents of infrequently used portions have not deteriorated. The purge operation would read each word, correct bits and rewrite the word in memory.

And an expensive but certain method of design to compensate for soft errors is systems redundancy.

Today's dynamic RAMs have not been observed encountering double errors per alpha, but 64K charge coupled devices do exhibit this tendency. In a 64K CCD, the soft error rate varies upwards of 10%/1K hrs and has been observed at 300%/1K hrs, Geilhufe said.

The soft error is greater on denser chips because of several factors including lower power voltage and smaller cell dimensions. The alpha "clouds" can strike various portions of the cell. One of the most crucial for DP is the soft errors that can occur on the bit line during the memory cycle. As memory cycles get shorter, they become more susceptible to alpha particles.

Ounce of prevention

But computer systems manufacturers can increase the reliability of their products through extensive components' qualification programs and working with the components suppliers, Victor J. Ohm of Amdahl Corp. told Compcon attendees.

Amdahl's testing program has found dynamic RAMs of 4K and 16K have had a 40- to 50% disqualification rate. Emitter coupled logic (ECL) RAMs have fared better, with a reject rate of 20% for chips with densities of 128, 256 and 1K bit densities. As an example of improvements that can be realized through such a testing program and extensive work with the suppliers, Amdahl has cut down its failure rates of RAMs. Measured in %/K hrs, bipolar 256 bit RAMs have dropped from .0138 to .0052 between 1976 and 1978 while the failure rate for 1K bit MOS RAMs went from .0172 to .0047.

Systems designers should have a full understanding of the reliability features of the components and provide adequate error correction capabilities. Once again it looks like the hardware guys are depending on the software guys to make their products acceptable. Let's face it, the cost has to be somewhere in the system.

What of CCD devices?

With a purported lower reliability factor, one naturally questions what Memorex and Storage Technology Corp. (STC) are doing with their soon-to-be shipped storage products incorporating CCDs. Also, makers of CCDs, Fairchild and Texas Instruments, went through a period of not shipping devices while they dealt with the problems.

The Memorex 3770, a cache device for disks, is designed to use CCD memory and will be shipped two weeks behind schedule in the first part of April. Memorex uses the same type of error correction as it does on its disk products, an 11 bit burst error correction, so it feels it has the alpha problem solved, according to Mark Lutvak, manager, product sales support at Memorex. In addition, a purging routine is not needed as the updated data is written directly to the disk so there is always a version outside of the CCD realm.

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Memorex is looking at alternate solid state devices, such as 32K RAMs or the use of partial CCDs if the supply is not adequate to meet what Lutvak termed an "overwhelming demand" considering the product is still in beta test.

STC's 4305 product manager Garry Holtwick said STC intends to ship its 4305 the last day of March, during the first quarter as scheduled. However, volume shipments will not start until June ... so it's all in how one interprets "customer shipments." The 4305 emulates and is designed to replace the IBM 2305 Model 2 fixed head disk. The 4305 offers a 0.7 msec average access time compared to 5 msec for the 2305-2, and thus is designed to handle paging.

Holtwick said both Fairchild and TI now are shipping CCDs, although the latter held back on orders because the devices were encountering a high reject rate at STC. The 4305 will consist of 64K CCDs and is designed with double bit error correction and triple bit detection and will incorporate a purging function that will rewrite a word into memory, he added.

Et tu, semiconductor makers?

It seems logical that the semiconductor makers will come out with their own version of solid state disks. If the systems catch on in the market, they will provide a sizeable avenue of distribution for CCDs, and RAMs. Why wouldn't this be a convenient product for semiconductor makers to step into the world of peripheral systems? We have previously thought of solid state memory in terms of main memory but maybe we'll have to revise our thinking.

Disks -- faster, larger capacity

It's not really news that disks will become faster with larger capacity; the question is how soon and how fast and how big. IBM generally is credited with first use of thin film head on its new 3370 drive announced with the 4300s, and it won't be long before other vendors follow suit.

Frank Sordello, manager of Memorex's Recording Technology Center, indicated capacity can improve up to 16 times the current level of Winchester-type technology if one implements both thin film head and media.

DISK DRIVES NOW AND FUTURE (Source: Memorex Recording Technology Center)

	Track/in.	Bit/in.	Aerial Density (Mbit/sq in.)	Write Mbit/sec (3,600 rpm)	Flying Height Head to Media (micro-inch)	Media Thickness (micro-inch)	Access Time (msec)
Current Ferrite Head, Oxide Media (Mem. 3650)	480	6,359	3	10	20	36	25
Theoretical Limitations of Ferrite Head, Oxide	1,000	9,000 (standard code)	10	20	16		
Thin Film Head, Oxide Media (believed to be IBM 3370)	660	12,000 (different code)		15 (3,000 rpm est.)	15 (est.)		
Theoretical Limitations of Thin Film Head, Oxide	1,500	12,000 (different code)	18	20 (standard code)	15		
Theoretical Limitations of Thin Film Head & Media	2,000	12,000 to 25,000	@50	40	10 to 15	4	15

One of the variables is the coding used in recording. FMM code is here termed "standard".

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DISK DEVELOPMENT HISTORY (Source: IBM)

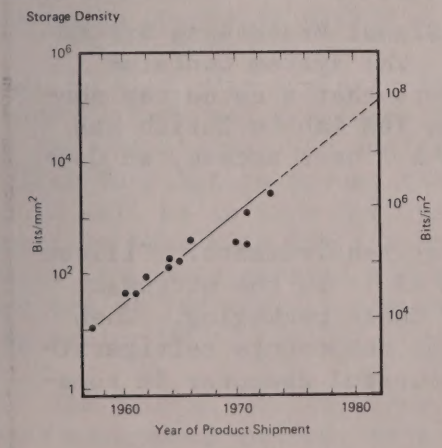
Year	Device	Cap. (MB)	Bits/ sq. in.	4K blk. access (ms)	Dollars per MB
1956	IBM 350	5	2K	925	$153
1964	IBM 2311	7.3	110K	113	75
1965	IBM 2314	29.1	220K	85	23
1970	IBM 3330-1	100	775K	43.3	8.30
1973	IBM 3330-11	200	1495K	43.3	4.85
1973	IBM 3340	70	1650K	39.6	7.50
1975	IBM 3350	317	3058K	39.6	2.25
1978	STC 8650	635	6100K		

Twenty-three years of progress in disk storage

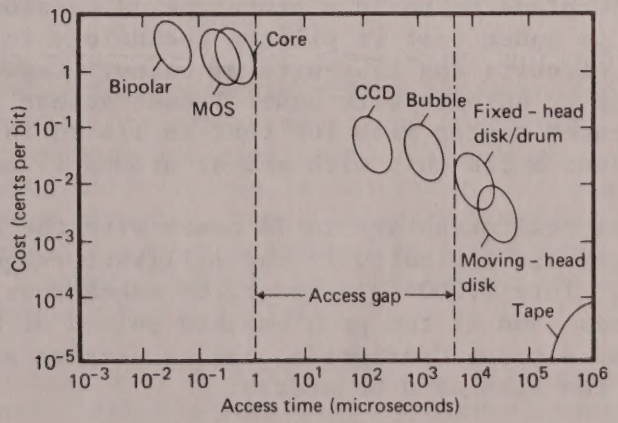
The current recording density of 8,000 to 9,000 bit/in. with standard code is the threshold beyond which thin film head or a major breakthrough in oxide technology is needed, Sordello said. With thin film head and oxide media, 12,000 bit/in. stretches the capability of the media while the head is loafing. But at 25,000 bit/in. with thin film head and thin film media, both are challenged, he said.

With thin film technology, it will be possible to have 640 Mbyte/platter on a 14 in. platter by 1985, Sordello said. However, it is more than likely future disk drives will be smaller in physical size -- about twice the size of a slide carousel. Enter the 8 inch disk, which is seen as the next hot item in the disk race. IBM recently released a picture of its 8-inch disk. Although there is some industry speculation of the size of the 3370 platter, Sordello believes it is not 8-in.

Thin film makes it possible to deposit more information on a given surface and the heads are capable of reading these smaller bits. The current coating on disks consists of pieces of oxide and is called particulate coating, whereas the thin film method deposits information in a much smaller, smoother manner. Thin film heads, made by a semiconductor process, will fly closer to the disk and also can read smaller bits -- thus the increased density.



Disk storage density vs time (Source: IBM)



Storage technologies cost/hit vs access time

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Al Hoagland, manager of recording media at IBM's San Jose operation, said he expects to see several thousand Mbytes per spindle in the 80s with aerial density approaching 100 Mbit/sq. in. while still with particulate media -- media that does not use thin film technology.

Shades of 1984

Disks are not the only element of the data processing domain on the threshold of change. Developers of Josephson Junction and Ovonic film are busy readying their technologies for the marketplace.

Josephson Junction, a superconducting switching which occurs at cryogenic temperatures, is known to be very fast and very small. Hollis Caswell, director of data systems assurance at Poughkeepsie and formerly involved with JJ development, told EDP/IR devices incorporating JJ aimed at limited functions should be in the marketplace by 1984.

When one considers the paraphernalia necessary to supply the liquid helium to keep the JJ devices cold -- -269 degrees Centigrade -- one is talking about a system that consumes about the same amount of space and power as current IBM gear, for generally speaking it is the peripherals that take up the floor space. Although a JJ device can operate off a storage battery, the coolant requires K Watts. "The cost of the refrigerator will be compensated for by the reduction in cost of precision power supplies normally used in a silicon technology machine," according to Caswell.

Josephson Junction operates on the principle that little power is needed to transfer electrons between two superconducting metal films separated by a very thin dielectric film. "The device can be switched from the zero voltage state where pairs of superconducting electrons tunnel with zero voltage drop across the thin dielectric layer to the voltage state where single electrons tunnel across this layer."

The switching speed has been measured at 29 picoseconds -- which is as fast as could be detected. The device performance is predicted as three times that possible with silicon and can probably handle speeds under 50 picosec for a loaded logic circuit. For cache memory, IBM expects access times of 0.5 nsec with current fabrication technology.

IBM plans to build a prototype JJ version of the Signal Processing System which is under test in silicon technology in the lab. The system contains 6,000 circuits and 150K bits of cache. Caswell projects that a cache can contain up to 4K bits with under 1 nsec access time. The IBM lab in Zurich has fabricated a chip with 16K that is 1/4 sq in. and has a 7 nsec access, so Caswell sees a 32K chip with access around 15 nsec.

The real advantage to JJ comes with the small power requirements. Silicon voltages are typically in the milliWatt range whereas JJ is in the microWatt frame. This 1,000-fold reduction makes possible very dense packaging. When JJ comes, and if the problems are solved of keeping the components refrigerated, 269 degrees Centigrade, one can expect a fairly powerful computer in something the size of a briefcase.

But the impact of JJ is hard to discern at this point, as EDP/IR thinks there is a need for a method of attaching I/O to the JJ that is as clever as

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the technology itself, and this has yet to be developed. The I/O connections between the CPU and the rest of the system don't appear to be as advanced. Caswell described the CPU as on a rod dipped in a box of helium with all I/O connections coming out of the top of the rod.

What about ovonic film?

The use of crystalline silicon has inherent qualities that limit the density of devices fabricated with it. The limitations include a temperature barrier of 120 degrees Centigrade beyond which its extrinsic properties disappear. The temperature barrier is important because as devices become denser, they generate more energy.

Stanford R. Ovshinsky of Energy Conversion Devices, Inc. in Troy, Mich., described his latest version of amorphous silicon based alloy that has up until now been used in relation to energy conversion. The material can be made in "infinite" sizes and is more receptive to photolithography than is crystalline-based silicon. The alloy will remain extrinsic beyond 300 degrees Centigrade, thus removing the density barrier created by power dissipation requirements. "The recombination kinetics of our materials are so high that a whole new generation of high speed devices which are ideal for digital use is possible," Ovshinsky said.

With this alloy, doping can be in the effective parts per million range and designers can think in terms of complete circuits. The new material can be the basis of new transistor-type as well as photoconductor devices.

EDP/IR suspects that the use of amorphous film will make possible another generation of computation capability, which will be achieved via optical computers. In contrast with JJ technology, the amorphous film can achieve switching speeds under 120 picoseconds in room temperature.

Where will we see Ovshinsky's alloys? They are already appearing in the marketplace via licenses to such firms as 3M, IBM and Burroughs. Burroughs and ECD jointly developed a 1K bit nonvolatile 15 nsec bipolar read-write memory. ECD has issued licenses to 3M for microlithography technique that permits changes to microfilm, although these changes are evident. IBM is working on an optical mass memory.

IBM MAKES CORPORATE OFFICE A TRIUMVIRATE

Paul J. Rizzo was recently named to the corporate office along with Chairman Frank T. Cary and President John R. Opel. The corporate office tends to day to day operations. In addition, Rizzo was also appointed to the long term policy formulation group, the corporate management committee. Thus Rizzo could well be in line for Opel's job when Cary retires in two years. It's no surprise that with IBM's source of income changing from a lease to purchase base, it should turn to a financial type. Rizzo's background includes controller of IBM World Trade and VP for financial planning of IBM before becoming senior VP of the Data Processing Product Group in 1974.

IBM made a raft of other moves, putting Dean R. McKay, also in the corporate management office, on the IBM board. Rizzo's successor is Arthur Anderson, formerly president of General Products Division. Anderson is succeeded by William W. Eggleston, who has been working with Rizzo.

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• IBM TELEGRAPHED 158 USERS THERE WILL BE AN H SERIES MODEL DELIVERED in 1981 that should fit their upgrade needs (and be air cooled). The message was in the form of an offer to supply a special trade-in allowance toward the new machine on leased or rented 158s that are purchased between Feb. 8 and April 30, 1979. How's that for a three-month long "first day order window" for an unannounced product. This special credit is in addition to the 50% purchase credits these users may have accrued. The special credit varies from 14.5% to 20% of the February, 1979 price of a 158; those who turn their 158s in at the beginning of '81 receive higher credit than those that trade in at the end of that year. IBM wants the 158s for something, it seems. The special credit is applied toward the price of the new machine. In addition, users can use their purchase option credits, which are accruable up to 50%, toward the purchase price of their 158. Looks as though a 158 user who becomes an owner can wind up with a member of the H series for quite a bit less cash outlay than others. The deal applies to "anything that says 158" i.e. the 158-1 and -3, the MP version but not the AP unit.

Why the move? It is one way to keep that cash flow coming in -- spread over two quarters in 1979. As the percentage of revenue from its lease base dwindles in proportion to that received from purchases, IBM will be pushed to maintain a steady cash income. Perhaps it is a way of getting a preview of the demands for this as-yet-unknown member of the H series. It is a way of telling the world the H series will be delivered in 1981. In IBM verbiage, the move is to "provide an additional financial option to customers."

• IBM'S GSD IMPLEMENTS AN OEM DISCOUNT ON S/1. The maximum discount of 15%, although considerably smaller than that prevalent in miniland, actually makes the machines quite competitive as there was somewhat of a discount imbedded in the original unit pricing. The discounts start with 5% for quantity of 50 to 99, and reach the maximum 15% for 150 or more. Shipments of machines must be gin within 18 months. But IBM didn't give away the store by any means. There are five categories of equipment, and units from column A cannot be added to column B for a larger discount. But that might change in the future. The peripherals eligible for the discount are those "unique" to the S/1, IBM said.

• SATELLITE BUSINESS SYSTEM IS PICKING UP STEAM and products. Among the more noteworthy adjuncts to its offering are high-speed (6.3 Mbit/sec) controllers to handle data transmission without changes in existing computer software between any two SBS customer network nodes. The controllers will permit resource sharing and load leveling as well as backup and increased security. SBS plans to demonstrate them beginning fourth quarter of 1979. Bunker Ramo will start marketing production units in the third quarter of 1980 that will have communications adaptors to provide compatibility with a variety of computer systems. . . . AM International, Inc., formerly Addressograph-Multigraph, will deliver to SBS in first quarter 1980 two prototypes of electronic mail units that can transmit up to 1.5 Mbit/sec -- 156 times greater than is possible over 9,600 bit/sec lines. The units will be capable of sending 3,600 page/hr -- 120 times faster than most current facsimile devices -- and the image quality should compare favorably with original typewritten documents. The unit embodies computer control, digital laser scanning techniques and non-impact printing technology. Looks as though SBS is getting ready for its scheduled debut in 1981. Meanwhile no news from the judiciary on whether SBS' alleged anticompetitive ownership structure needs reexamination by the FCC.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" February 23, 1979 • VOL.14,NO.18 P.J.McGOVERN,PUBLISHER

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USER BUDGETS TO HIT $47 BILLION IN 1979 AS DP EXPENDITURES KEEP PACE WITH INFLATION

Nothwithstanding the potential turmoil in the oil fields, 1979 should be another good year for the computer industry, if the results from an IDC survey of users continue to predict future trends. Users anticipate a 14.4% increase in expenditures for the year, and nearly all sectors share the increases.

But overall, users are carving up their budgets and allocating their pennies in much the same proportion as last year. A few notable points are:

- Expenditures for software packages will rise a whopping 36% over the 1978 figure, leading all other categories in growth.

- Communications -- remote equipment plus line charges as a separate subcategory declined to 11.7% from last year's 20% growth. The most probable explanation is that equipment costs for distributed and/or remote equipment are allocated to the user departments.

- The trend of hardware costs declining and people costs rising continues, with the hardware budget subtotal, excluding communications gear, rising 13% while personnel costs are up 15%.

Reading between the lines, it looks as though there is evidence of the strong trend toward purchasing of IBM 30X as the categories of rental or lease payments to manufacturer and lease payments to third party are below the overall rate of increase and account for less of the user's budget in 1979 than was the case last year.

As a corollary, capital expenditures for expensed purchases should rise a whopping 33% over the 1978 figure and account for 2.2% of users' budgets this year compared with 1.9% in 1978. With or without remote equipment such as data entry and communications gear, hardware expenditures show a modest decline in this portion of the budget.

The software/services sector should grow more than twice as fast as the hardware sector, including communications gear, with a hefty 25% rise over the 1978 figure compared with hardware's 12% growth rate.

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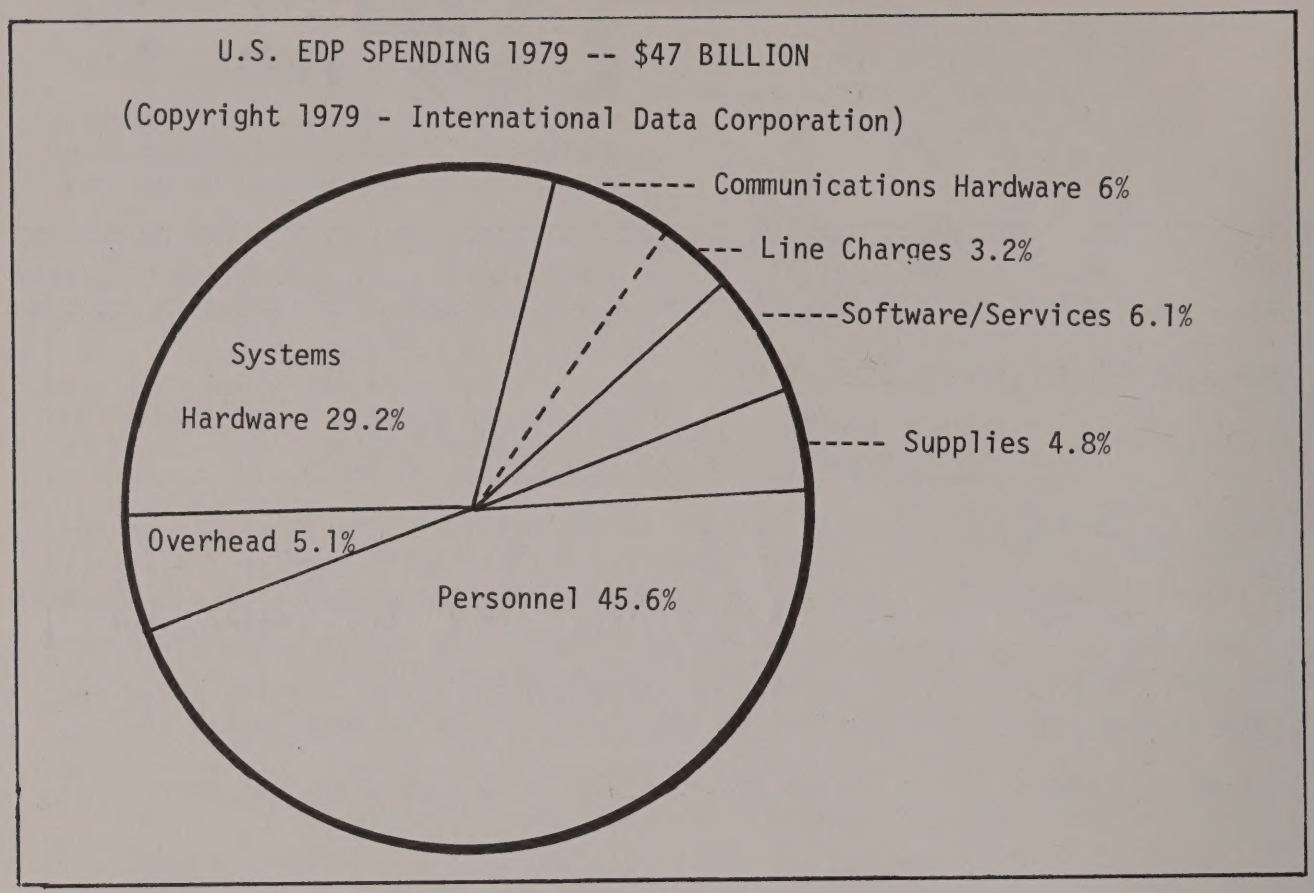

Software/Services -- 1979's star

The software packages sector, with a projected 36% growth in expenditures, outpaces all other areas and leads the entire software/services category to a 25% growth over the 1978 figure. This year users should be allocating more than 6% of their total budget to software/services, according to the survey of nearly 200 users conducted by IDC.

Custom software and consulting will also grow at a faster rate than the overall 14.4%, but data entry and computer output microfilm (COM) services will attain a mere 12% increase. Time-sharing/remote job entry is slated to take a smaller slice of the pie than last year, down 2% to .6% of the overall budget, perhaps because of allocation of these expenditures to other areas.

The survey of DP departments does not include expenditures by non-DP departments, which traditionally account for a hefty portion of the overall services business. IDC expects the services sector to grow at a compound annual rate of 17% from 1978 to 1983, rising from $4.9 billion to $10.7 billion in 1983. The figures include worldwide revenues of U.S. firms.

Users expect to spend nearly $1.8 billion for packaged software in 1979, up from $1.3 billion last year. The popularity of canned software continues to climb as users attempt to avoid reinventing the wheel and to keep staff expenditures somewhat under control.

Staff expenditures rose 13% in 1978 and users expect this figure will rise to 15% this year, or .3% above last year's portion of the budget.

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U.S. EDP USER SPENDING 1977-1979
(Copyright 1979-International Data Corporation)

	1977 $M	78/77 % Δ	1978 $M	79/78 % Δ	1979 $M	1979 % Total
Systems Hardware	10,850	11.8	12,135	12.9	13,710	29.2
Software	1,600	21.6	1,945	29.6	2,520	5.3
Services	310	12.9	350	1.4	355	.8
Software/Services Subtotal	1,910	20	2,295	25	2,875	6.1
Data Entry, Data Comm. And Other Remote Equipment	2,150	20	2,580	9	2,800	6.0
Communications Line Charges	1,045	20	1,255	18	1,485	3.2
Communications Subtotal	3,195	20	3,835	11.7	4,285	9.2
Supplies	1,825	10	2,000	13	2,255	4.8
Staff Related Expenses	16,450	13	18,620	15	21,430	45.6
Overhead	1,830	17	2,140	12	2,390	5.1
TOTAL BUDGET	36,060	13.8	41,025	14.4	46,945	100.0

Communications

The communications sector, including line charges and data entry, data communications and other remote equipment, went from being one of the fastest growing sectors last year (20% rate) to one of the slowest growing (11.7%).

Line charges and other communications expenses will rise 18%, not much off the 20% rate last year, but the real change comes in the hardware portion, which is scheduled for only a 9% growth this year compared with 20% in 1978. EDP/IR thinks the 9% is not a true indication of the growth rate of communications hardware. Companies are likely allocating the cost of this equipment to the user departments. Where that is not the case, the increasing sophistications of remote gear may be prompting respondents to categorize it in another manner, thus appearing in systems hardware.

Or, perhaps users are waiting to see whether Satellite Business System, Bell's Advanced Communications System or some other scheme such as Xerox's Xten becomes the overwhelming favorite, thus predicating what type of terminal and protocol they may want. Also, IBM is more relaxed and allows older terminals to be linked with SNA nets via 8100 or the S/1.

Trends

The survey discerned several trends evolving among users, including:

- Implementation of distributed processing.
- Organization of planning groups.

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U.S. EDP USER SPENDING: 1977-1979

(Copyright 1979-International Data Corporation)

	1977 $M	78/77 % Δ	1978 $M	79/78 % Δ	1979 $M	1979 % Total
Rental or Lease Payments to Manufacturer	5,400	8	5,815	11	6,430	13.7
Lease Payments to Third Party	1,600	13	1,805	7	1,930	4.1
Depreciation Charges for Purchased Equipment	2,225	16	2,580	15	2,960	6.3
Capital Expenditures for Expensed Purchases	660	20	790	33	1,050	2.2
Maintenance Charges on Owned Equipment	965	19	1,145	17	1,340	2.9
Systems Hardware Budget Subtotal	10,850	12	12,135	13	13,710	29.2
Data Entry, Data Communications And Other Remote Equipment	2,150	20	2,580	9	2,800	6.0
All Hardware	13,000	13	14,715	12	16,510	35.2

- Consolidation of communications.

- Administration of word processing.

Distributed processing is moving out of the talking phase and into the implementation phase. The equipment for DDP includes minis and small business computers as well as clustered processing terminals. There were 121,000 stations of these terminals in the U.S. as of yearend 1978 and, with the growth spurt from DDP and IBM's 8100, this sector should grow 32%/year, IDC predicts.

Users are now turning to formal planning groups for long range planning. Formerly a secondary function, this activity is assuming more importance within DP departments. These groups are buying outside expertise and also are prompting the DP departments to be smarter buyers, demanding benchmarks on products that previously were acquired without such a thorough search. Vendors of small business machines selling into a large corporate environment may find the going tougher than in the past.

Whereas networks had a way of evolving in the past, now users are playing a more active role in their design after they complete internal use requirement surveys. As communications costs decline, there should be an increasing use of the facilities for office use, teleconferencing, electronic mail and DDP.

DP managers are assuming responsibility for word processing with the leaders of this trend being utilities. Heavy users of WP are the banking and insurance sectors and the primary applications are for legal, accounting and customer service. The use of WP should grow 2.5 times in the next five years.

Users' concerns are much the same: personnel turnover, selection of EDP training, evaluating price/performance and residual value, and backup needs.

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SYSTEMS MANUFACTURERS REVENUE
($ Million -- Computer Operations)

	1973	1974	1975	1976	1977	78/77 %Δ	1978
IBM	9,234	10,510	11,850	13,400	14,765	15.6	17,074
NCR	885	1,122	1,415	1,674	1,944	15.2	2,240
Burroughs	1,068	1,293	1,457	1,612	1,794	17.1	2,100 e
Univac	1,123	1,294	1,433	1,467	1,726	17.0	2,020
CDC	948	1,101	1,246	1,358	1,513	23.5	1,868
DEC (6/30)	265	422	534	736	1,059	35.7	1,437
HIS	843	856	856	914	1,037	24.8	1,294
TOTAL	14,366	16,598	18,791	21,161	23,838	17.6	28,033
IBM %	64.3	63.3	63.0	63.3	61.9		60.9

MAINFRAMERS' REVENUE GROWTH TOPS 17%;
NEARLY DOUBLING 1973 REVENUES

The figures confirm what everyone felt was happening last year. 1978 was a blockbuster year for mainframers with an overall average gain in revenues of 17.6%, the largest increment since the recovery in 1973. The combined revenues of the seven makers topped $28 billion, just about double the 1973 total. For the second straight year, mainframers' gains in professed revenues managed to top the rise in user spending.

The wealth in revenue gains was broadspread, with the lowest increment, 15.2%, belonging to NCR, which held on to its number two spot in computer related revenues. The biggest gain was that of Digital Equipment Corp., as was the case in 1977, although the increase dropped to 24.8% this year.

CDC barely led Honeywell for the honor of most improvement in revenue compared with the 1977/1976 growth. CDC's doubled from 11.4% to 23.5% while HIS nearly doubled from 13.5% growth in 1977 to 24.8% in 1978. Burroughs wasn't loafing either; its growth jumped from 11.3% in 1977 to 17.1% in 1978. And IBM, with its huge revenue base, scored an impressive 16% gain, which is all the more impressive when one considers the average for the previous nine years is an 11% revenue gain.

IBM alone in front

As usual, no one closed the distance between IBM and the rest of the pack. But IBM did drop one percentage point. Interestingly, the pack was more closely bunched between second and fifth place than previously. Perhaps next year will see some shift in the rankings there.

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GENERAL-PURPOSE COMPUTER CENSUS

Counts in the General-Purpose Computer Census are based on the best information available to IDC -- but are estimates nevertheless. Computer makers, as a rule, do not directly supply this type of data. General-purpose computers -- as characterized by IBM's 370, 303X and competitors -- comprise the bulk of digital computers by value. They are primarily character or byte oriented and programmed in higher-level language.

Instead of being pegged to constantly shifting average values, size classes are based on currently marketed IBM products and other manufacturers' models that compete with them, e.g., a computer in Size Class 7 would compete with an IBM 3033 or 168. (Other classes can be checked under IBM's column.) Note that many mainframe manufacturers also offer smaller systems that are included in the Small Business Computer Census, which will be published in an upcoming issue of the EDP/IR. An "x" in the last column means no new-built systems are on order from the original manufacturer.

AS OF JANUARY 1, 1979

NAME OF MANUFACTURER	COMPUTER MODEL	SIZE CLASS	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
Amdahl	470V/5	6	$ 60,000	9/77	28	8	36	35
	470V/6	7	$ 83,000	6/75	113	41	154	85
	470V/7	7	$ 89,000	8/78	9	4	13	30
	470V/8	7	$ 90,000	9/79	-	-	-	10
	Total				150	53	203	160
Burroughs	B2/3/500	3	$ 6,600	11/61	365	245	610	X
	B1710	2	$ 2,700	8/72	1,110	620	1,730	X
	B1720	3	$ 6,900	2/73	560	280	840	X
	B1820/30	2	$ 3,000	5/77	70	80	150	175
	B1860/70	3	$ 6,500	5/77	225	125	350	425
	B2500	4	$ 10,400	2/67	40	60	100	X
	B2700	4	$ 10,700	8/72	375	200	575	X
	B2800	4	$ 11,900	12/76	95	26	121	90
	B3500	4	$ 19,000	5/67	285	245	530	X
	B3700	4	$ 25,000	11/72	335	275	610	X
	B3800	4	$ 17,800	4/77	75	30	105	120
	B45/4700	5	$ 32,000	10/71	340	135	475	X
	B4800	5	$ 36,000	9/76	80	55	135	90
	B5500	5	$ 35,000	3/63	37	14	51	X
	B5700	5	$ 33,500	12/70	4	6	10	X
	B65/6700	6	$ 66,000	11/69	160	110	270	X
	B6800	5	$ 47,500	6/77	65	50	115	100
	B7700	7	$142,000	8/73	37	21	58	5
	B7800	7	$150,000	11/78	2	1	3	20
	Total				4,260	2,578	6,838	1,025
CDC	Omega 480-1	4	$ 10,700	6/77	48	-	48	60
	Omega 480-2	5	$ 14,200	8/78	2	-	2	5
	Cyber-71	4	$ 20,000	7/76	4	9	13	5
	Cyber-171	4	$ 27,000	8/77	9	29	38	35
	Cyber-72	5	$ 41,000	10/71	14	48	62	X
	Cyber-172	6	$ 48,000	7/75	28	42	70	15
	Cyber-73	6	$ 62,000	3/72	21	36	57	X
	Cyber-173	6	$ 79,000	9/75	10	38	48	5
	Cyber-74	7	$141,000	3/72	29	16	45	X
	Cyber-174	6	$ 97,000	9/75	10	14	24	2
	Cyber-175	7	$147,000	8/75	20	30	50	30
	Cyber-76	7	$184,000	3/72	7	10	17	X
	Cyber-176	7	$184,000	1/78	6	2	8	10
	G-20	4	$ 19,300	4/61	3	-	3	X
	1604	6	$ 41,000	1/60	8	-	8	X
	31/3150	4	$ 9,700	12/64	48	19	67	X
	3170	5	$ 22,500	12/70	19	17	36	X
	3200	4	$ 14,700	5/64	31	20	51	X
	3300	5	$ 34,500	9/65	86	50	136	X
	3400	5	$ 23,500	11/64	3	3	6	X
	3500	5	$ 31,000	1/69	30	10	40	X
	3600	6	$ 49,000	6/63	16	13	29	X
	3800	6	$ 60,000	12/65	12	2	14	X
	6200	6	$ 44,000	11/70	-	3	3	X
	6400	6	$ 63,000	5/66	47	33	80	X
	6500	6	$ 86,000	12/67	15	12	27	X
	6600	7	$116,000	8/64	49	21	70	X
	6700	7	$140,000	7/70	3	-	3	X
	7600	7	$195,000	1/69	23	6	29	X
	Star-100	7	$280,000	12/74	4	-	4	X
	Cyber-203	7	$210,000	/79	-	-	-	5
	Total				605	483	1,088	172
Cray	Cray 1A	7	$196,000	4/76	6	2	8	8
DEC	2020	3	$ 6,900	7/78	60	5	65	125
	2040	4	$ 10,900	6/76	85	65	150	25
	2050	4	$ 19,500	5/77	70	30	100	70
	2060	5	$ 22,500	2/79	-	-	-	20
	PDP-6	4	$ 10,000	10/64	6	1	7	X
	1040/50	4	$ 17,300	10/67	140	110	250	X
	1060/70	5	$ 21,000	6/72	140	100	240	30
	1080/90	6	$ 30,500	6/75	135	65	200	60
	Total				636	376	1,012	330
Honeywell	H-61/40	2	$ 2,100	6/76	-	470	470	]
	H-61/58	2	$ 2,300	6/74	120	660	780	] 250
	H-61/60	2	$ 3,300	6/74	75	1,040	1,115	]
	H-Level 62	3	$ 5,200	10/74	630	880	1,510	400
	H-Level 64	4	$ 11,200	10/74	270	610	880	220
	H-66/05/07	4	$ 18,100	10/76	73	120	193	100
	H-66/10/17	5	$ 29,000	6/75	69	100	169	30
	H-66/20/27	5	$ 40,000	11/74	90	120	210	15
	H-66/40/60	6	$ 80,000	10/74	87	83	170	30
	H-66/DPS	6	$ 71,000	7/78	2	1	3	35
	H-66/80	7	$120,000	10/74	15	16	31	10
	H-68/80	7	$102,000	10/74	15	2	17	X
	H-68/DPS	7	$121,000	9/78	1	1	2	10
	S-60 Subtotal				1,447	4,103	5,550	1,100
	C-50	2	$ 1,900	8/70	195	1,150	1,345	X
	C-100	3	$ 4,900	4/66	85	975	1,060	X
	C-200	4	$ 10,000	4/61	110	18	128	X
	C-400	4	$ 15,900	5/64	195	160	355	X
	C-500	6	$ 77,000	4/65	35	21	56	X
	C-6023/25	5	$ 33,000	11/73	31	26	57	X
	C-6030/40	5	$ 43,000	6/71	53	120	173	X
	C-6050/60	6	$ 73,000	7/71	88	64	152	X
	C-6070/80	6	$111,000	7/71	55	32	87	X
	C-6180	7	$108,000	2/74	5	-	5	X
	Gamma 10	2	$ 2,500	7/64	-	590	590	X
	Gamma 30	4	$ 10,000	2/62	-	43	43	X
	G-Subtotal				852	3,199	4,051	X
	H-105/115	3	$ 6,400	3/70	210	240	450	X
	H-110/120/200	3	$ 6,600	1/66	340	230	570	X
	H-125	4	$ 8,600	12/67	18	120	138	X
	H-2020/30	3	$ 4,400	1/73	505	175	680	X
	H-1015/2015	4	$ 18,500	2/71	55	40	95	X
	H-1200	4	$ 14,600	2/66	200	76	276	X
	H-2040	4	$ 13,700	4/72	210	120	330	X
	H-2050/2060	4	$ 21,000	4/72	145	112	257	X
	H-2200	4	$ 20,000	1/66	89	27	116	X
	H-2070	5	$ 36,000	5/72	31	2	33	X
	H-3200	5	$ 28,500	2/70	85	36	121	X
	H-4200	5	$ 46,500	9/68	10	3	13	X
	H-8200	6	$ 71,000	2/69	14	10	24	X
	H-4/1400	4	$ 13,500	12/61	12	14	26	X
	H-8/1800	5	$ 35,000	12/60	10	12	22	X
	H-Subtotal				1,934	1,217	3,151	X
	Total				4,233	8,519	12,752	1,100

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GENERAL PURPOSE COMPUTER CENSUS
AS OF JULY 1, 1978

IDC LIBRARY

COMPUTER MODEL	CLASS	NUMBER IN U.S.	NUMBER OUTSIDE U.S.	TOTAL NUMBER
AMDAHL				
470V/5	6	17	3	20
470V/6	7	90	27	117
470V/7	7	–	–	–
470V/8	7	–	–	–
Total		107	30	137
BURROUGHS				
B2/3/500	3	360	260	620
B1710	2	1230	605	1835
B1720	3	540	235	775
B1820/30	2	–	–	–
B1860/70	3	180	40	220
B2500	4	50	70	120
B2700	4	390	200	590
B2800	4	55	23	78
B3500	4	290	245	535
B3700	4	350	275	625
B3800	4	34	10	44
B45/4700	5	340	135	475
B4800	5	57	20	77
B5500	5	38	14	52
B5700	5	7	7	14
B65/6700	6	160	110	270
B6800	5	47	20	67
B7700	7	34	17	51
B7800	7	–	–	–
Total		4162	2286	6448

GENERAL PURPOSE COMPUTER CENSUS
AS OF JULY 1, 1978

CDC LIBRARY

MPUTER MODEL	CLASS	NUMBER IN U.S.	NUMBER OUTSIDE U.S.	TOTAL NUMBER
CDC				
Omega 480-1	4	25	—	25
Omega 480-2	5	—	—	—
Cyber-71	4	4	6	10
Cyber-171	4	3	2	5
Cyber-72	5	14	50	64
Cyber-172	6	23	39	62
Cyber-73	6	21	36	57
Cyber-173	6	10	38	48
Cyber-74	7	30	17	47
Cyber-174	6	10	16	26
Cyber-175	7	18	16	34
Cyber-76	7	7	10	17
Cyber-176	7	1	—	1
G-20	4	3	—	3
1604	6	8	—	8
31/3150	4	48	19	67
3170	5	19	19	38
3200	4	32	22	54
3300	5	86	59	145
3400	5	3	3	6
3500	5	30	10	40
3600	6	16	13	29
3800	6	12	2	14
6200	6	—	3	3
6400	6	50	40	90
6500	6	15	12	27
6600	7	49	22	71
6700	7	3	—	3
7600	7	23	6	29
Star-100	7	4	—	4
Cyber-203	7	—	—	—
Total		567	460	1027

GENERAL PURPOSE COMPUTER CENSUS
AS OF JULY 1, 1978

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COMPUTER MODEL	CLASS	NUMBER IN U.S.	NUMBER OUTSIDE U.S.	TOTAL NUMBER
CRAY				
Cray 1A	7	4	1	5
DEC				
2020	3	—	—	
2040	4	75	60	135
2050	4	55	20	75
2060	5	—	—	—
PDP-6	4	6	1	7
1040/50	4	155	135	290
1060/70	5	110	97	207
1080/90	6	85	34	119
Total		486	347	833

GENERAL PURPOSE COMPUTER CENSUS
AS OF JULY 1, 1978

IDC LIBRARY

COMPUTER MODEL	CLASS	NUMBER IN U.S.	NUMBER OUTSIDE U.S.	TOTAL NUMBER
HONEYWELL				
H-61/40	2	–	350	350
H-61/58	2	121	740	861
H-61/60	2	79	1030	1109
H-Level 62	3	590	730	1320
H-Level 64	4	245	470	715
H-66/05/07	4	62	60	122
H-66/10/17	5	68	88	156
H-66/20/27	5	90	120	210
H-66/40/60	6	86	57	143
H-66/DPS	6	–	–	–
H-66/80	7	14	13	27
H-68/80	7	15	2	17
H-68/DPS	7	–	–	–
S-60 Subtotal		1370	3660	5030
G-50	2	220	1300	1520
G-100	3	85	1020	1105
G-200	4	110	27	137
G-400	4	200	195	395
G-600	6	35	26	61
G-6033/25	5	31	26	57
G-6030/40	5	54	135	189
G-6050/60	6	88	64	152
G-6070/80	6	55	32	87
G-6180	7	5	–	5
Gamma 10	2	–	630	630
Gamma 30	4	–	52	52
G-Subtotal		883	3507	4390

GENERAL PURPOSE COMPUTER CENSUS
AS OF JULY 1, 1978

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COMPUTER MODEL	CLASS	NUMBER IN U.S.	NUMBER OUTSIDE U.S.	TOTAL NUMBER
HONEYWELL (continued)				
H-105/115	3	225	275	500
H-110/120/200	3	350	245	595
H-125	4	20	145	165
H-2020/30	3	535	206	741
H-1015/2015	4	59	53	112
H-1200	4	205	90	295
H-2040	4	225	140	365
H-2050/2060	4	146	113	259
H-2200	4	91	33	124
H-2070	5	32	2	34
H-3200	5	88	36	124
H-4200	5	11	3	14
H-8200	6	14	10	24
H-4/1400	4	12	16	28
H-8/1800	5	10	13	23
H-Subtotal		2023	1380	3403
Total		4276	8547	12823

GENERAL PURPOSE COMPUTER CENSUS
AS OF JULY 1, 1978

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COMPUTER MODEL	CLASS	NUMBER IN U.S.	NUMBER OUTSIDE U.S.	TOTAL NUMBER
IBM				
System/38-3	2	—	—	—
System/38-5	3	—	—	—
System/3-4	2	620	170	790
System/3-6	2	830	810	1640
System/3-8	2	5130	4600	9730
System/3-10	2	7350	5200	12550
System/3-12	3	4700	2870	7570
System/3-15	3	3080	1830	4910
S/3 Subtotal		21710	15480	37190
4331	3	—	—	—
4341	4	—	—	—
3031	6	50	30	80
3032	6	15	8	23
3033	7	45	15	60
370/115	3	1070	2510	3580
370/125	4	1050	1950	3000
370/135	4	1490	2320	3810
370/138	4	1760	1910	3670
370/145	5	1430	1590	3020
370/148	5	1250	1180	2430
370/155	6	475	315	790
370/158	6	1550	1430	2980
370/165	7	120	42	162
370/168	7	650	310	960
370/195	7	13	4	17
370 Subtotal		10968	13614	24582

GENERAL PURPOSE COMPUTER CENSUS
AS OF JULY 1, 1978

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COMPUTER MODEL	CLASS	NUMBER IN U.S.	NUMBER OUTSIDE U.S.	TOTAL NUMBER
IBM (continued)				
360/20	3	980	1840	2820
360/22	3	86	105	191
360/25	3	83	370	453
360/30	4	1650	870	2520
360/44	4	42	42	84
360/40	4	1060	770	1830
360/50	5	500	275	775
360/65	6	400	150	550
360/67	7	19	9	28
360/75	7	25	17	42
360/85	7	1	2	3
360/9X	7	10	6	16
360 Subtotal		4856	4456	9312
1130	2	1325	1200	2525
1401	3	500	440	940
1401-G	2	10	8	18
1401-H	2	5	—	5
1410	4	29	26	55
1440	3	59	81	140
1460	4	14	10	24
1620	3	105	91	196
7010	5	6	3	9
7030	7	2	—	2
7040/44	5	9	13	22
7070/74	5	70	11	81
7080	6	23	—	23
7090/94	6	28	9	37
Subtotal		2185	1892	4077
Total		39719	35442	75161

GENERAL PURPOSE COMPUTER CENSUS
AS OF JULY 1, 1978

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COMPUTER MODEL	CLASS	NUMBER IN U.S.	NUMBER OUTSIDE U.S.	TOTAL NUMBER
ITEL				
AS/3	4	—	—	
AS/4	5	48	2	50
AS/5	6	57	13	70
AS/6	6	5	—	5
Total		110	15	125
MAGNUSEN				
M80/3	4	—	—	—
M80/4	5	—	—	—
Total				
NCR				
8270	2	—	—	—
8350	2	23	—	23
8370	3	—	—	—
8410	2	—	—	—
8430	3	2	—	2
8450	3	100	5	105
8550	3	300	175	475
8560	4	20	—	20
8570	4	45	50	95
8580	5	—	—	—
8590	6	—	—	—
Century-50	2	405	45	450
Century-75	2	90	—	90
Century-100	3	315	675	990
Century-101	3	935	740	1675
Century-151	3	290	115	405
Century-200	4	225	380	605
Century-201	4	300	155	455
Century-251	4	70	74	144
Century-300	5	85	85	170
315	3	80	120	200
315-RAC	4	20	18	38
Total		5305	2637	5942

GENERAL PURPOSE COMPUTER CENSUS
AS OF JULY 1, 1978

IDC LIBRARY

MPUTER MODEL	CLASS	NUMBER IN U.S.	NUMBER OUTSIDE U.S.	TOTAL NUMBER
ERRY-UNIVAC				
III	4	80	28	108
55-80/90	3	—	4	4
418I, II	4	44	51	95
418 III	4	44	88	132
491/492	5	13	10	23
494	6	61	58	119
1004	2	245	215	460
1005	2	205	82	287
1050	3	120	45	165
1106	6	81	210	291
1107	6	4	8	12
1108	7	152	91	243
1110	7	58	74	132
9200	2	525	610	1135
9300	3	410	455	865
9400/80	4	230	420	650
90/25	3	50	70	120
90/30	3	720	980	1700
90/40	4	—	—	—
90/60	4	107	112	219
90/70/9700	5	17	38	55
90/80	5	21	9	30
1100/10	5	55	85	140
1100/20	5	15	37	52
1100/40	6	35	45	80
1100/81/82	6	23	20	43
1100/83	7	—	—	—
1100/84	7	—	—	—
Subtotal		3315	3845	7160

GENERAL PURPOSE COMPUTER CENSUS
AS OF JULY 1, 1978

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COMPUTER MODEL	CLASS	NUMBER IN U.S.	NUMBER OUTSIDE U.S.	TOTAL NUMBER
SPERRY-UNIVAC (continued)				
301	4	26	4	30
501	5	4	–	4
3301	5	41	–	41
Spectra 70/15	3	3	–	3
Spectra 70/25	3	–	7	7
Spectra 70/35	4	55	1	56
Spectra 70/45	5	155	8	163
Spectra 70/46	5	25	1	26
Spectra 70/55	5	5	–	5
Spectra 70/60	6	25	–	25
Spectra 70/61	6	4	–	4
Spectra 1600	3	35	–	35
Spectra 70/2	4	34	–	34
Spectra 70/3	4	16	–	16
Spectra 70/6	6	34	–	34
Spectra 70/7	6	21	–	21
Subtotal		483	21	504
Total		3798	3866	7664

GENERAL PURPOSE COMPUTER CENSUS
AS OF JULY 1, 1978

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COMPUTER MODEL	CLASS	NUMBER IN U.S.	NUMBER OUTSIDE U.S.	TOTAL NUMBER
SINGER				
System 10	2	1450	1200	2650
XEROX				
Sigma 5	4	122	21	143
Sigma 6	4	32	14	46
Sigma 7	5	58	9	67
Sigma 8	4	5	6	11
Sigma 9	6	76	30	106
530	3	102	37	139
550/560	4	54	5	39
940	5	39	3	42
9300	3	15	4	19
Total		483	129	612
TOTAL (All Manufacturers)		58467	54960	113427

AS OF JANUARY 1, 1979

NAME OF MANUFACTURER	COMPUTER MODEL	SIZE CLASS	AVERAGE MONTHLY RENTAL	DATE OF FIRST INSTALLATION	NUMBER OF INSTALLATIONS IN U.S.	NUMBER OF INSTALLATIONS OUTSIDE U.S.	TOTAL NUMBER OF INSTALLATIONS	TOTAL NUMBER UNFILLED ORDERS
IBM	System/38-3	2	$ 3,600	8/79	-	-	-	5,000
	System/38-5	3	$ 9,700	2/80	-	-	-	3,000
	System/3-4	2	$ 1,300	6/76	580	160	740	X
	System/3-6	2	$ 1,800	12/70	740	700	1,440	X
	System/3-8	2	$ 2,100	6/75	4,850	4,250	9,100	X
	System/3-10	2	$ 2,700	1/70	6,900	4,700	11,600	X
	System/3-12	3	$ 3,800	3/76	4,550	2,980	7,530	X
	System/3-15	3	$ 6,800	3/74	3,130	2,000	5,130	200
	S/3 Subtotal				20,750	14,790	35,540	8,200
	4331	3	$ 7,600	6/79	-	-	-	2,000
	4341	4	$ 18,900	11/79	-	-	-	2,000
	3031	6	$ 61,000	3/78	230	210	440	1,200
	3032	6	$114,000	3/78	100	90	190	350
	3033	7	$180,000	3/78	220	120	340	450
	370/115	3	$ 9,300	4/74	1,040	2,370	3,410	X
	370/125	4	$ 13,000	6/73	980	1,800	2,780	X
	370/135	4	$ 20,500	5/72	1,290	1,820	3,110	X
	370/138	4	$ 21,000	11/76	1,910	2,700	4,610	200
	370/145	5	$ 39,000	7/71	1,210	1,370	2,580	X
	370/148	5	$ 34,500	3/77	1,600	1,970	3,570	50
	370/155	6	$ 72,000	2/71	440	290	730	X
	370/158	6	$104,000	5/73	1,550	1,430	2,980	X
	370/165	7	$133,000	6/71	115	42	157	X
	370/168	7	$194,000	7/73	650	310	960	X
	370/195	7	$275,000	3/71	13	4	17	X
	370 Subtotal				11,348	14,526	25,874	6,250
	360/20	3	$ 2,900	12/65	900	1,680	2,580	X
	360/22	3	$ 3,700	7/71	76	90	166	X
	360/25	3	$ 8,300	10/68	76	340	416	X
	360/30	4	$ 11,200	6/65	1,560	800	2,360	X
	360/44	4	$ 18,700	7/66	42	37	79	X
	360/40	4	$ 19,000	6/65	1,050	740	1,790	X
	360/50	5	$ 33,500	8/65	495	240	735	X
	360/65	6	$ 70,000	11/65	390	135	525	X
	360/67	7	$140,000	6/66	16	7	23	X
	360/75	7	$122,000	1/66	25	11	36	X
	360/85	7	$183,000	10/69	1	1	2	X
	360/9X	7	$197,000	11/67	10	5	15	X
	360 Subtotal				4,641	4,086	8,727	X
	1130	2	$ 2,600	2/66	1,240	1,100	2,340	X
	1401	3	$ 3,700	9/60	500	415	915	X
	1401-G	2	$ 2,400	5/64	10	5	15	X
	1401-H	2	$ 1,750	6/67	5	-	5	X
	1410	4	$ 17,100	11/61	24	19	43	X
	1440	3	$ 4,700	4/63	56	78	134	X
	1460	4	$ 9,600	10/63	14	9	23	X
	1620	3	$ 2,700	9/60	94	82	176	X
	7010	5	$ 25,500	10/63	6	3	9	X
	7030	7	$160,000	5/61	1	-	1	X
	7040/44	5	$ 30,000	6/63	9	13	22	X
	7070/74	5	$ 27,000	3/60	62	9	71	X
	7080	6	$ 60,000	8/61	23	-	23	X
	7090/94	6	$ 71,000	8/60	25	8	33	X
	Subtotal				2,069	1,741	3,810	X
	Total				38,808	35,143	73,951	14,450
Itel	AS/3	4	$ 13,700	11/78	8	2	10	75
	AS/4	5	$ 23,000	6/77	70	20	90	100
	AS/5	6	$ 37,500	3/77	120	45	165	150
	AS/6	6	$ 57,500	5/78	30	10	40	60
	Total				228	77	305	385
Magnuson	M80/3	4	$ 6,200	/79	-	-	-	25
	M80/4	5	$ 10,000	12/78	6	-	6	50
	Total				6	-	6	75
NCR	8270	2	$ 1,700	11/79	-	-	-	100
	8350	2	$ 3,200	6/77	110	-	110	125
	8370	3	$ 5,500	7/78	10	-	10	50
	8410	2	$ 3,000	2/79	-	-	-	50
	8430	3	$ 4,800	6/78	10	-	10	30
	8450	3	$ 6,800	11/77	175	65	240	200
	8550	3	$ 11,700	4/76	310	235	545	80
	8560	4	$ 13,600	11/77	40	10	50	40
	8570	4	$ 17,400	5/76	65	75	140	60
	8580	5	$ 35,000	12/78	3	-	3	45
	8590	6	$ 50,000	9/79	-	-	-	5
	Century-50	2	$ 1,700	2/71	390	50	440	X
	Century-75	2	$ 2,200	7/76	75	-	75	X
	Century-100	3	$ 3,300	9/68	300	630	930	X
	Century-101	3	$ 4,100	10/72	860	670	1,530	X
	Century-151	3	$ 5,400	2/73	270	145	415	X
	Century-200	4	$ 7,600	9/69	200	335	535	X
	Century-201	4	$ 11,600	8/74	255	150	405	X
	Century-251	4	$ 20,500	11/73	60	72	132	X
	Century-300	5	$ 26,500	2/72	85	85	170	X
	315	3	$ 3,400	5/62	73	100	173	X
	315-RMC	4	$ 10,400	9/65	18	16	34	X
	Total				3,309	2,638	5,947	785
Singer	System 10	2	$ 2,700	10/70	1,400	1,200	2,600	X
Sperry-Univac	III	4	$ 27,000	8/62	80	28	108	X
	SS-80/90	3	$ 8,500	8/58	-	4	4	X
	418 I, II	4	$ 10,700	6/63	44	51	95	X
	418 III	4	$ 40,500	6/69	44	88	132	X
	491/492	5	$ 28,000	12/61	13	8	21	X
	494	6	$ 81,000	2/66	61	58	119	X
	1004	2	$ 1,100	2/63	240	200	440	X
	1005	2	$ 2,000	4/66	200	80	280	X
	1050	3	$ 9,000	9/63	120	36	156	X
	1106	6	$ 45,500	12/69	75	190	265	X
	1107	6	$ 60,000	10/62	4	8	12	X
	1108	7	$ 92,000	9/65	152	85	237	X
	1110	7	$145,000	6/72	58	73	131	X
	9200	2	$ 2,300	6/67	525	560	1,085	X
	9300	3	$ 5,000	9/67	410	410	820	X
	9400/80	4	$ 12,600	5/69	230	420	650	X
	90/25	3	$ 4,200	8/77	55	95	150	50
	90/30	3	$ 8,200	2/75	755	1,100	1,855	300
	90/40	4	$ 15,500	6/78	5	10	15	75
	90/60	4	$ 24,000	1/74	110	130	240	40
	90/70/9700	5	$ 29,000	8/72	17	40	57	5
	90/80	5	$ 64,000	12/76	30	15	45	25
	1100/10	5	$ 40,500	4/76	60	135	195	100
	1100/20	5	$ 55,000	4/75	16	38	54	5
	1100/40	6	$ 95,000	7/75	36	46	82	5
	1100/81/82	6	$112,000	3/77	36	37	73	60
	1100/83	7	$195,000	12/78	1	1	2	10
	1100/84	7	$238,000	11/78	1	-	1	5
	Subtotal				3,378	3,946	7,324	680
	301	4	$ 6,700	10/60	26	4	30	X
	501	5	$ 15,800	6/59	2	-	2	X
	3301	5	$ 23,500	7/64	41	-	41	X
	Spectra 70/15	3	$ 4,600	9/65	3	-	3	X
	Spectra 70/25	3	$ 7,800	9/65	-	7	7	X
	Spectra 70/35	4	$ 14,400	1/67	53	3	56	X
	Spectra 70/45	5	$ 27,000	11/65	150	6	156	X
	Spectra 70/46	5	$ 44,500	11/68	23	1	24	X
	Spectra 70/55	5	$ 41,500	11/68	5	-	5	X
	Spectra 70/60	6	$ 51,000	9/70	25	-	25	X
	Spectra 70/61	6	$ 55,000	3/71	4	-	4	X
	Spectra 1600	3	$ 4,300	1/69	35	-	35	X
	Spectra 70/2	4	$ 14,100	7/71	34	-	34	X
	Spectra 70/3	4	$ 23,500	10/71	15	-	15	X
	Spectra 70/6	6	$ 39,000	10/71	34	-	34	X
	Spectra 70/7	6	$ 48,000	10/71	18	-	18	X
	Subtotal				468	21	489	X
	Total				3,846	3,967	7,813	680
Xerox	Sigma 5	4	$ 14,600	8/67	121	21	142	X
	Sigma 6	4	$ 25,000	11/70	32	13	45	X
	Sigma 7	5	$ 29,000	12/66	58	9	67	X
	Sigma 8	4	$ 22,500	9/71	5	6	11	X
	Sigma 9	6	$ 57,000	11/71	76	30	106	X
	530	3	$ 4,200	8/73	101	37	138	X
	550/560	4	$ 14,500	11/74	29	5	34	X
	940	5	$ 26,000	4/66	36	3	39	X
	9300	3	$ 8,500	11/64	15	4	19	X
	Total				473	128	601	X
TOTAL					57,960	55,164	113,124	19,170

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• AT LAST, A GOVERNMENT STANDARD FOR I/O channel level interface has been created. The Federal Information Processing standard, modeled on the IBM 360/370 interface, requires all agnecies procuring medium and large computers after Dec. 13, 1979 to limit selection to those having the specified interface. Exemptions to this will be granted by Commerce Secretary Juanita Kreps only if the agency head can cite "major adverse economic or operational impact." The standard applies to tape drives and operational specifications are being ironed out on rotating mass storage subsystems. The National Bureau of Standards expects the standard will save the federal government $61 million over the next five years. The peripherals sector has been supporting the measure for years, but mainframers, most notably Honeywell, have opposed the concept. The standard could mean their peripherals will face a whole new competitive era.

• IBM LOADS ITS "INFORMATION DISTRIBUTOR" with functions including: copying, laser printing -- condensed print, both sides of page and with different typestyles --, and extensive communications capabilities. Input can be via mag cards, System 6, computers or other 6670s. Print speed is up to 36 pages a minute. The $75,000 Model 6670 "links word processing and data processing" and looks like IBM's high-end electronic mail entry. Deliveries begin second quarter this yar from the Office Products Division's Boulder plant. . . . Other happenings in the copier plus field: Wang cut the price of its intelligent copier to $32K from $35K and dropped the copier feature. We have yet to see Xerox's electronic mail/intelligent copier device enter the commercial mart, but there's a multipurpose device at the White House that works well, according to government users.

• CASH SPEAKS VOLUMES and NCR's offer to pay $26 cash for 2.4 million shares of Comten stock was oversubscribed. The other 800,000 shares tendered will be purchased on a pro rata basis.

• CII HONEYWELL BULL AND UNIVAC MAKE OEM DEALS with CPT and Bunker Ramo, respectively. CII-HB's non-exclusive agreement with word processor vendor CPT is expected to lead to close technical collaboration in word processing. CII-HB's 1978 earnings were up 32% despite a 53.8% decrease in its subsidy from the French government. Univac has cemented an OEM agreement to buy Bunker Ramo banking terminals for use with its processors. The terminals will be marketed by Univac's International Division.

• WHOPPERS WILL BE TALLIED BY NIXDORF gear. Burger King has ordered $2.6 million worth of Nixdorf's 600/40 distributed processing systems as replacement for ordered IBM 3790 gear.

• UNIVAC TAKES FOUR ORDERS FROM CHINA. With the adage that if Carter won't let it sell to the Soviets, try the Chinese, Univac has booked four systems from the People's Republic of China, including an 1100/12 from the State Seismological Bureau in Peking and and 1100/11 for use by the Research Institute of Petroleum Processing in Peking.

• SAM WYLY BOWS OUT. Another original who was on the computer industry scene at an early age in a vigorous manner has (temporarily?) departed. Wyly, founder and chairman of the board of Wyly Corp., which spawned Datran, resigned, citing an SEC probe of the company and its efforts to raise capital. With his experience, most likely Wyly will soon be active in the industry.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" FEBRUARY 15, 1979 • VOL.14,NO.17 P.J.McGOVERN,PUBLISHER

Small business market attracts entrants -- Page 5

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XEROX'S XTEN PLAN CITES MARKET GROWTH; SPURS CONTROVERSY OVER ELECTRONIC MAIL EVOLUTION

It doesn't take much imagination to envision why electronic mail will encounter rapid acceptance once the facilities for inter and intracompany communications via electronic means are in place. But it does take some imagination to conceive exactly how the regulatory scene is going to permit the evolution of electronic mail, which combines computer and communications technologies.

The issue of regulation appears on the scene as more and more companies, both large and small, set in place their plans to offer electronic mail facilities. On the one hand, there is the Federal Communications Commission. On the other hand, there is the U.S. Postal Service and its cohort, the Postal Rate Commission, which may find they disagree over who has jurisdiction over what. This could be one of the potentially more interesting hassles to unravel in electronic mail's "Foggy Bottom."

The FCC has recently said that if the USPS wants to offer electronic mail service it must apply for permission to the FCC. The USPS previously applied to the Postal Rate Commission for first class electronic computer originated mail (Ecom). To get a handle on what is going on in his agencies, President Carter established a taskforce under the National Technological Information Agency (NTIA) to solicit comments. The period for comments has been extended indefinitely; sources say the comments against the USPS entering electronic mail have been numerous. And we've yet to hear from Congress -- the bills mentioning electronic mail last year didn't pass.

Xerox's petition to the FCC to allocate use of part of the radio spectrum for use by electronic mail facilities (EDP/IR, Nov.17,1978) contains extensive market projections on the amount of mail that exists now through 1990.

Among the predictions are:

- The number of pages delivered for business purposes in the U.S. will jump from 80 billion in 1980 to 109.2 billion in 1990.

- By 1990, the employee workforce of prospects will exceed 48 million.

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- The two most compelling reasons for use of electronic mail are: increasing cost of delivery because of labor costs and new office communications products that will displace "much of the labor associated with physical delivery systems."

Xten's market would be the intermediate size companies, most of which are communicating on an intercompany basis. Xerox states there are more than 873 companies and government agencies that have more than 50 locations in the U.S. Additional targets include 62 companies with less than $100 million revenue; 207 companies with less than $250 million in revenue and several federal and state government agencies.

The Xten plan includes use of 10.55-10.68 GHz for cellular radio for local distribution of signals. From Xten local and city nodes to the offices of subscribers there would be wide-sector coverage; return transmissions from offices to the Xten city node would use highly directional antennas. The subscriber transceiver will send and receive at a minimum of 256k bit/sec and receive all communications directed toward its sector but store locally only data addressed to that particular location. A single subscriber transceiver can serve a number of user devices each with a discrete address.

The long distance communications would be handled by satellites, leased from current or proposed domestic satellite carriers (SBS?). It's worth mentioning that shortly after the Xten filing, Xerox made a bid to acquire Western Union International. This would give Xerox the clout that comes from being an international record carrier. As Xerox pointed out, the only part of the scheme for which it needs FCC approval is the spectrum allocation. Xerox says its proposal allows for 10 carriers, each having 10 MHz, and leaves some space for those occupying the frequency now, such as mobile radio carriers. Each Xten carrier would subdivide its 10 MHz into two 5 MHz subchannels, for transmission and reception.

Xten appears to line up in potential competition with Ma Bell's Advanced Communications System (EDP/IR, June 26,1978) and IBM Satellite Business Systems (SBS) (EDP/IR, Sept. 20,1978). And there are other carriers in the wings. Some are getting their feet wet with limited service offerings such as Southern Pacific Communications Co.'s facsimile service.

The Xten digital network would provide message transmission for:

- Facsimile
- Data
- Still-frame video
- Two way voice channels

Among the features of the network are:

- Store-and-Forward Service
- Priority Control -- ranging from immediate to overnight
- Multiple Distributions -- users identify only a particular list

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- Transparent Pipeline Service -- a direct logical connection on a virtual circuit basis that accommodates various protocols.

- Security -- via encryption. Password access and subscriber encryption of messages will be optional.

- Message Accountability -- audit trails for users, with logs at control centers for location of missing documents

- Device compatibility, interconnection -- Xten will provide conversion to permit a variety of terminal devices to be used and will offer standardized interconnection arrangements.

Reception by others

At least one point in the Xten proposal drew opposition: the requirement that a carrier receiving bandwidth allocation in the spectrum outlined by Xerox should intend and be able to serve at least the 100 largest metropolitan areas. Such coverage is necessary, Xerox argues, if approximately two-thirds of the potential market is to be reached. Xten, the proposal notes, plans to serve about 200 areas. "Xten proposes to own, operate and be the licensee of local distribution radio stations -- possibly the microwave radio facilities and satellite earth stations as well."

The Common Carrier Association for Telecommunications (CCAT), which represents multipoint distribution service (MDS) operators who provide TV signals in cities, objected to the FCC that the requirement to serve 100 cities excludes small operators. The association also cautioned there may be a conflict of interest resulting from Xerox's role as an office gear supplier.

Others submitting comments included Satellite Business Systems, American Satellite Corp., and AT&T, none of whom were in opposition to the plan, although there were some reservations. SBS suggested the FCC ask for other ideas for the use of the frequency in question. Amsat thought the entry requirements were too stiff, and AT&T indicated it might want to use some of the spectrum for its services and would not want the bandwidth limited to electronic message service.

To ward off the specter of tie-ins and conflict of interests, Xerox told the FCC it will establish a new subsidiary "devoted exclusively to the provision of regulated telecommunications services." Shades of SBS.

A COMPARISON OF PROPOSED NETWORKS . . .

	ACS	XTEN	SBS
Type of Net:	Intercompany	Intercompany	Intracompany
Link Technology:	Land lines except where imbedded in the public network	Microwave and satellite	Satellite, local loops provided on demand
Transmission:	Analog and Digital	Digital	Digital
Maximum Speeds:	56 Kbps	256 Kbps	6.3 Mbps
Customer Set:	Small Medium Large	Medium Large (need for 3 or more stations)	Large (need for 20 or more stations)
Features:	Store-and-foreward	Store-and-foreward	Dynamic allocation
	Customer access to stored data	Customer access to stored data	
	Broadcast capability (multipoint) least likely to be used	Broadcast capability (multipoint more likely to be used	Broadcast capability (multipoint) most likely to be used
Good For:	Data, message	Message, data, fax	Voice, data, message, fax, video

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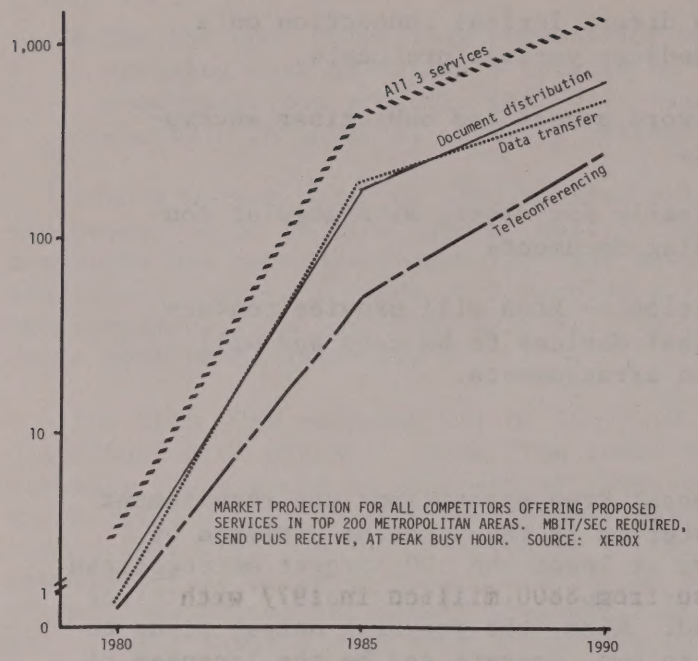
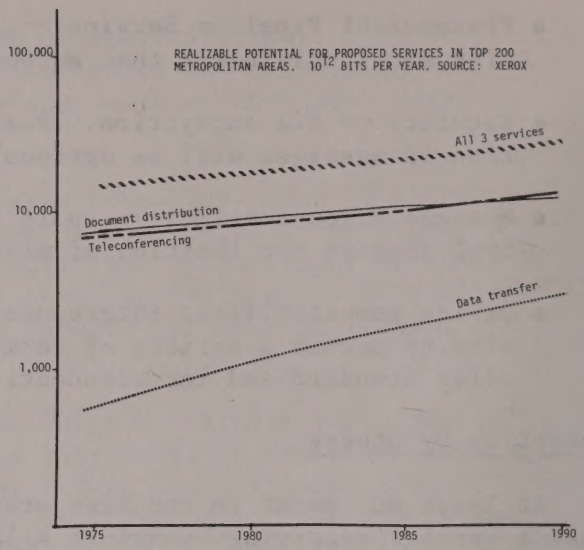


MARKET PROJECTION FOR ALL COMPETITORS OFFERING PROPOSED SERVICES IN TOP 200 METROPOLITAN AREAS. MBIT/SEC REQUIRED, SEND PLUS RECEIVE, AT PEAK BUSY HOUR. SOURCE: XEROX



REALIZABLE POTENTIAL FOR PROPOSED SERVICES IN TOP 200 METROPOLITAN AREAS. 10^{12} BITS PER YEAR. SOURCE: XEROX

Notice realizable potential is measured in bits per year, whereas the criteria for market projection is the peak hourly load in bit/sec.

Among the assumptions Xerox used to derive the above estimates is the initiation of service by late 1980. The bandwidth selected for teleconferencing was 66k bit/sec, including 50 for still frame video and 16 for two-way voice. Xerox recognizes that teleconferencing growth is difficult to predict because it involves psychological factors not well understood. The combined market projections are based solely on current applications, and thus could significantly underestimate the ultimate usage rates as new applications evolve.

Xerox would appear well positioned to reap benefits from its electronic mail enterprise. With its word processors, facsimile devices and copiers -- soon to be super intelligent office centers -- it has in place all the pieces. Xerox takes the global view with WUI.

It is too early to tell who will corner the electronic mail market. The important factor that someone should be considering is the ultimate compatibility between electronic mail services. We can only hope that the nascent communications industry will show up the somewhat stodgy computer industry by providing compatibility between vendors' services.

MA BELL'S ACS DRAWS COMMENTS

Vendors have lined up for and against ACS, with most comments coming from those leery of seeing Ma Bell put yet another foot in what is seen as the province of DP services. Those vouching for ACS include Digital Equipment Corp., said to be named a supplier of ACS components, and the Association of Data Communications users. Those opposing ACS include: Computer and Business Equipment Manufacturers Association (Cbema), Honeywell, and the Computer and Communications Industry Association (CCIA) who charge ACS constitutes data processing. IBM, fearing regulation of anything that might be called the computer area, suggests ACS should be unregulated. The Association of Data Processing Service Organizations (Adapso), Tymnet and Telenet ask for a ruling on Computer Inquiry II first and say the offering is not really new.

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SMALL BUSINESS SEGMENT GROWS; ATTRACTS MORE ENTRANTS

Sometimes you can't keep pioneers from trying again. There are a number of veterans entering the small business sector. Interestingly, many can trace ties back to Xerox's various acquisitions such as Diablo and Scientific Data Systems. Why have they chosen to enter the small business segment? Perhaps a look at the growth projections of installed systems for this sector -- 340% between 1978 and 1982 -- provides a hint. Another factor prompting more entrants is the relative ease of assembly of components thanks to Silicon Valley's skills in making increasing complex chips.

Some interesting facets of the small business market in the U.S.:

- The installed base should grow from 73,400 units at year-end 1978 to 250,000 as of the end of 1982, according to an International Data Corp. (IDC) study.

- The value of shipments should rise from $800 million in 1977 with 21,350 units shipped to $2.6 billion with 65,800 systems in 1982, the IDC study predicts.

- Market participants fall into four categories: IBM, other mainframers, mini vendors and independents. The minimakers tend to supply units with communications capabilities that are used in divisions of larger companies.

- The manufacturing industry ranks first in the number of small business computers (SBC) installed, followed by the wholesale sector.

- Customer support was the primary selection criteria of users surveyed by IDC.

- The five top suppliers have 75% of installed units as of 12/77.

What exactly is a small business computer? Admittedly the lines blend among other categories of machines, but it is a computer that has internally stored data and instructions, at least 2K and generally 4K of main memory that is user programmable, and can be attached to peripherals. Furthermore, the vendors must offer at least one applications package geared to accounting-type functions. In a typical configuration, a small business computer generally costs less than $100,000. Some of the machines in the SBC category are: IBM System 32 and 34; Wang 2200, DEC Datasystem, Burroughs B80, NCR 8100. Qantel, and Microdata.

Although the market might seem sewn up, it isn't. There appears to be good opportunity for a large number of independents and "others."

Applications packages

As might be expected, most systems are used for accounts receivable, payable and payroll type applications, and 49.8% also handle inventory. But these entry level systems also accumulated their share of people supporting them. For instance, only 10.6% had one person; whereas 22.9% and 21% respectively, had two and three people on the staff.

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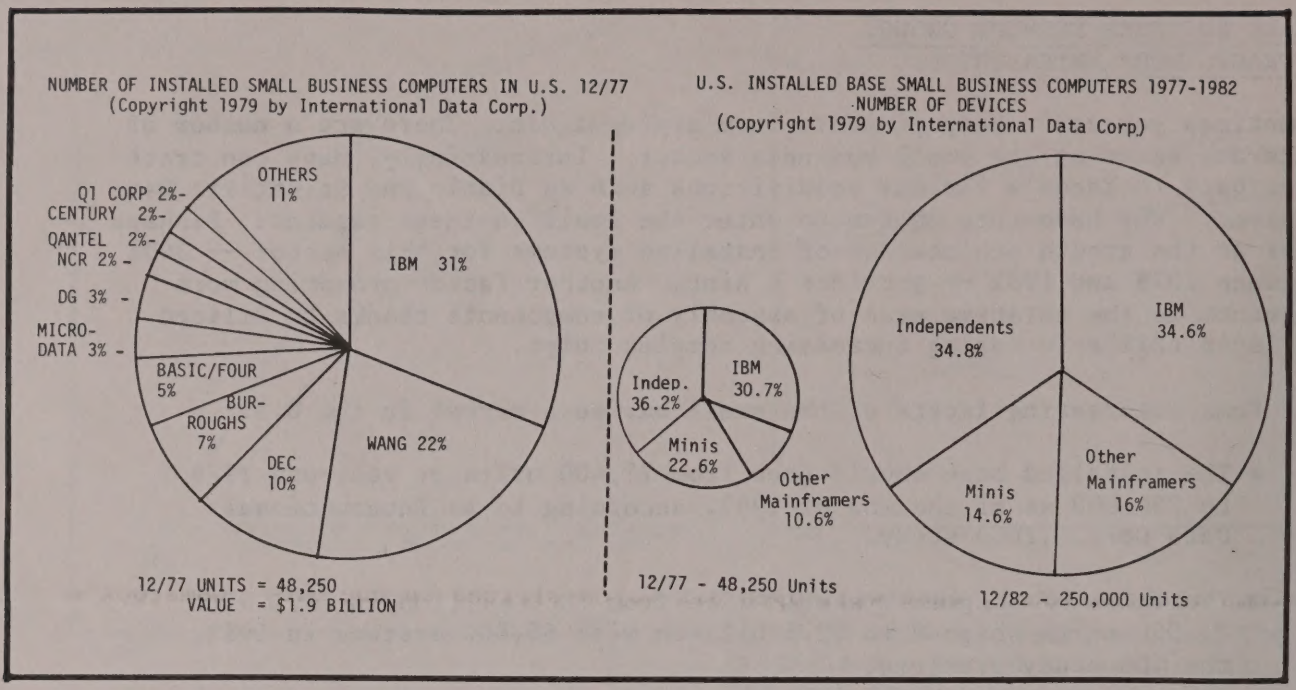

Software -- that necessary evil, was coped with by various means. The "other mainframers" (excluding IBM) came closest to satisfying needs of users. They were listed by 43% of respondents as the primary source of software packages. Compare this with 28.4% for IBM as the source; and 5.2% for minicomputer vendors and 11.9% for independents.

In every category, the predominant tendency was to develop the software in-house, which probably explains the number of support people.

Vistas of Phoenix

Once again the name Scientific Data Systems, Inc. arises. Known for its Sigma series CPUs which later became the backbone of the Xerox Data Systems line (now under Honeywell's umbrella), the familiar name is back again, but with a much smaller product. The SDS 420 fits on a desktop and is driven by an MOS Technology 6502A microprocessor. It has 32K of memory expandable to 56K and from 1.5- to 10 Mbytes of floppy storage. Also included are a keyboard and CRT with its own refresh memory. Software includes a 12K Basic interpreter and operating system. The cost is $7,700 in single quantity with OEM discounts available.

The old gang is still around, it seems. Jack Mitchell, developer of the Sigma computers at the old SDS, is president and another SDS founder, Henry L. Herrold, is director of engineering. Financing is also somewhat of a family affair. Max Palevsky, former president of the original SDS and now a financier of movies, is an the investor along with venture capitalist Arthur Rock.

SDS will have available within 90 days the standard assortment of business oriented applications packages such as accounts payable/receivable, general ledger, order entry, inventory management and payroll. Later, it will offer packages for vertical markets. SDS is geared to sell to the systems house but will sell to users in volume for specific applications. The target end user is a small business doing less than $1 million in revenues.

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Why the small business market? Mitchell observed it is the largest market in terms of numbers of computers, and one in which he is not fighting IBM head-on as the IBM offerings are much more expensive. Mitchell thinks he understands the computer marketplace, adding his firm of less than 10 people has 100 years of experience in the industry.

More of the old (Xerox) gang

True, the small business computer market is large, but it's large in two respects, commented George Comstock, founder of Diablo (which was also acquired by Xerox,) and of Durango Systems, another small business firm. There is a huge market for systems and there are also a lot of competitors, he explained. However, his firm is "on schedule" and he sees nothing to weaken his enthusiasm about the small business marketplace. Durango began shipping production units of its F-85 in December and expects to move to a 50,000 sq. ft. facility by June. He welcomed Mitchell to the club when told of SDS' rebirth.

Recently Comstock negotiated a joint venture with Mitsui, called Falcon Systems International, that will open six sales offices in the U.S. Comstock's ties with Mitsui hark back to 1970 when Mitsui was the Far East distributor for Diablo. Durango's primary channel of distribution in the U.S. is independent dealers, although the company has its own branch office in the San Francisco Peninsula to provide it direct contact with the end user's needs and problems. Currently there are 22 offices handling the Durango system.

Durango has signed a nationwide hardware maintenance contract with CalComp. Of the three elements of business success: outstanding product, sales and support, Comstock said the key lies in supporting the customer. The IDC study cites as the most important elements in selection criteria equipment reliability, customer support, and availability of applications.

To get an idea of the small large world of small business systems, another entry in the field is also related to Xerox. Shasta Data Systems handles marketing of a small business system that had its genesis at Diablo under Comstock's rule. A group that had been affiliated with Philips formed Shasta to distribute the system.

Different strokes

But just as there are many companies in the field, there are more and more ways of selling these systems. DEC sells the low end of its Datasystems line with packaged software through its retail store in a N.H. shopping mall as well as through distributors. A spokesman said the store is doing "quite well" and indicated suspicions DEC will open a similar store in Boston are well founded. The store also sells word processing gear and computer accessories and serves as a referral for those prospects who need bigger systems and more software.

Recently DEC revamped and strengthened its support program for commercial distributors, which is administered out of the commerical OEM group. Basically the scheme provides increased support to distributors, which are primarily systems houses. For instance, a logo identifies distributors in the program as "authorized Digital computer distributors." DEC has a three-year renewable agreement that helps distributors obtain equity funding. There's also a fund from which DEC will partially reimburse these distributors for advertising expenses. DEC provides books of advice on how to run a business.

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• LOOKS LIKE TEXAS INSTRUMENTS IS IN THE PERSONAL COMPUTER mart with its new TM900/189M, a single-board microcomputer system. Complete with a user's guide and an applications textbook, the micro board can be inserted in a three-ring notebook binder. The device is designed as a learning aid and includes 1K bytes of RAM, 4K of ROM, an audio cassette interface, alphanumeric keyboard and a 10-digit display which has a 32 character buffer. A standard EIA terminal or TTY interface may be added. The Speak and Spell maker also has a piezoelectric speaker for audio signals. The unit costs $299 and the power supply is $65. ... Harris' Semiconductor Products Division is also in the single-board arena, but its Micro-12 is industrial control and data acquisition applications. The Harris unit can interface directly with a TTY, CRT or tape cassette and accepts PDP-8 object code. The 12-bit CMOS HM-6100 costs $550.

• EUROPEAN LESSORS HAVE BANDED TOGETHER to encourage IBM to increase information available to users regarding the Giant's prices, technical specs and business practices in Europe. The European Computer Leasing and Trading Association (Eclat) consists of 28 lessors and used equipment dealers and constitutes the largest customer in Europe for new IBM equipment. The group wants IBM to distribute consultants' manuals, and make prices available to the public as is the case in the U.S. In addition, it plans to call to top management's attention violations such as preannouncements of IBM policies.

• ROCKY MOUNTAIN STATES' BANKS SHARE automated teller machines (ATM) in an electronic funds transfer switching system that is used by 50 banks and will be used by 160 banks in the future. The ATMs accept cards of all banks involved and the institutions installing the ATMs receive interchange fees from the association in charge of the network, the Rocky Mountain Bankcard Systems. The switch, an EFT 8500 marketed by Kranzley & Co., also will accept input from point of sale terminals.

• MINIMAKERS SLASH PRICES, UPGRADE MEMORY. Hewlett-Packard, thanks to a new power supply that fits in one cabinet, brought out a less expensive 3000-III, the 3000-II, that carries a $105K pricetag versus $115K on the -III. Systems Engineering Labs offers 600 nsec memory on its 32/57, 77 series and /30 processor. With the new memory, the 32/7760 costs $109.9K vs $104.7K with the 900 nsec memory (EDP/IR, Jan.15). Prices include peripherals and OS.

• FOR WEATHER FORECASTERS and other number-crunching buffs, Control Data's Cyber 203, an evolution of the Star 100, should do the trick. The conventional CPU is six times faster than that of the Star 100, while the vector processing unit handles 100 million calculations per second in a single operation. The new CDC top-of-the-line takes a Cyber 170 as a front end; system price ranges from $8 to $11.7 million. ... Speaking of large computers, Cray seems to be actively hauling in the orders from the likes of Boeing Computer Services (Seattle), Century Research Center Corp. (Tokyo), Bell Labs. (N.J.).

• MICROPROCESSOR PRICES ARE FUN TO WATCH. Intel Corp. is showing others the way with its 23% price cut on its 5MHz 8086 from $99 to $76.25 in quantities of 500 to 1,000. The price is down to $65.20 for the 4MHz version. A software development package for the 8086 permits creation of programs in PL/M-86, 8086 Assembler and contains a conversion utility to translate 8080/8085 Assembler source to 8086 Assembler. Programs written in PL/M-80 can be recompiled with little or no conversion, Intel said. The package costs $3,400.

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"E" SERIES BIDS ADIEU TO BATCH ARCHITECTURE; IBM TO CHARGE BASE FOR SOFTWARE SERVICES

In the beginning, there was batch from IBM. In the second generation there was batch and in the third generation there was also batch, with a few features that acknowledged the existence of time-sharing. With the 8100 (EDP/IR, Oct.20,1978), IBM gave a hint that it understood the world was changing and introduced a machine that for the first time was capable of CPU to CPU communications without the structure of a host in the network.

IBM has now brought forth the 4300 series of processors that are designed for distributed data processing and "are compatible with System/370." To EDP/IR, this verbiage means these are not part of the 370 line, as were the 303X, but are indeed part of another series. However, just as IBM did not unveil the major capabilities of the 370 series, i.e. virtual storage, with its first 370 systems, the 155 and 165, so perhaps is the case with the 4300 series. Building blocks are clearly in place to disperse intelligence throughout integrated system components such as disk controllers and multiple back and front end processors. But right now the 4331 and 4341 processors look like the fourth generation in 370 clothing.

- Price/performance. In one fell swoop, IBM has demolished the umbrella that encouraged plug compatible makers of peripherals and CPUs to join the fray. IBM cut by 80% the price of memory compared with that on 370s. The 4331 and 4341 processors are rated by IDC in the areas of the 370/138 and 158 although the CPU and memory prices are less than those of the 115 and 138, respectively.

- Software support charges and methods of support. IBM levied on its base a new scheme of charging for onsite software support for both system control programs (SCP) as well as for program products. To aid in improving cost efficiency, the Giant is implementing a free telephone solution service open around the clock. In addition, the 4300s feature remote diagnostic facilities. The Giant also is charging for some features on the 4300 that previously were free. Software support charges encourage rather than penalize the use of remote CPUs, in a manner somewhat akin to the 8100's Distributed Systems License Option.

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To some, the IBM 4300 announcement was a disappointment, for IBM did not unbundle and charge separately for its SCPs. But the words are on the wall -- software and/or software support will consume a larger share of users' budgets.

Perhaps as a glimpse into the future, look at the high degree of integration within the CPU. The days of the separate controllers are gone. Quite possibly, when IBM fully utilizes these various potentially intelligent components, we will see the 4300 in its true capabilities.

Lots of sectors within IBM are getting into the distributed data processing (DDP) act. The 8100 is built by the System Communications Division and the 4300 is from the Systems Products Division, which is responsible for medium-size systems. Both of these divisions, as well as Data Systems (large systems) and General Products (storage) are part of the DP Products Group. And General Systems Division is also in the act with its latest Series/1s. Both the 4300 and the 8100 feature heavy orientation to DDP and communications. Each can form a network of CPUs without a host, thus breaking the stranglehold IBM's Data Systems Division was trying to maintain over its base through the use of large systems as hosts. We have yet to see DSD dip into the IBM technology storeroom.

What will be the upgrade path for the 4300s? Will it be the 303X or something coming down the pike in the form of the H Series? IBM insists that program products for the 4300 will run on the 303X. But user programs written to fully utilize the capabilities of the 4300 native mode, known in IBM lingo as the Extended Control Program Support (ECPS), which run under the new DOS/VSE, cannot run on the 3033 as that operating system has not been announced for the top of the line. However, DOS/VSE has been tested on the 3031. The 4300 also has a "370 mode." There is no word from IBM on performance comparisons of programs run under the 370 mode and on the ECPS mode of the 4300s.

Eventually, there will be further extensions of capabilities in the system that will render user programs written to utilize these features incompatible with the 370 and "other plug compatibles." The Yellow Brick Road is paved in microcoding, which the users are sure to follow because the performance improvements will be undeniable.

HOW THE 4300s STACK UP: IDC RELATIVE PERFORMANCE CALCULATIONS

360/30	2.25	370/148	24
370/115	2.25	360/65	31.5
360/50	9.0	4341	37
370/135	9.0	370/158	41
4331	11.0	370/158-3	45
370/138	11.7	3031	54

PLUG-COMPATIBLES

Magnuson M80/3	17	Itel AS3-4	24
Itel AS3-3	18	CDC 480-2	28
Nat'l Semi 400	18	Itel AS4	28
NCSS	18	Magnuson M80/4	36
CDC 480-1	21	Itel AS5-1	41

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Some of the goodies revealed about the 4300s as well as announcements from DPD (a 3033 attached processor) and GSD (lower system and memory prices and the new, big disk on the S/38) are:

- The 4300s execute instructions more rapidly than various 370s because of improvements in logic fabrication and packaging (and most likely a good amount of microcode). A 4341 with 2M memory executes instructions up to 3.2 times faster than a 370/138 with 1M. A 4331 with 512K has up to four times the instruction rate of a 64K 115.

- With architecture that is suitable for DDP and different than that of the 370, the 4331 looks like a large 8100, and the same may be true of the 4341. A glimpse of future implications can be gleaned from the phraseology that the 4300s will run 370 programs in 370 mode. Emulation by any other name is still emulation.

- Another glimpse is offered by the 3880 Storage Control for the 4341. It could be a back end processor and/or the means by which the 4300's I/O channel can be widened eventually to yield higher throughput. The 3880 "provides two separate data paths into the processor for" disks, "for improved work load balancing." Perhaps the 3880 is IBM's Monday morning quarterback answer to the problems it encountered with the 3033's channel director -- which is thought to be a retrofitted 158 (EDP/IR,Aug.14,1978).

- Disk storage was updated and continues to decline in cost/byte. The 3370 disk, also available on the System/38, stores 571 Mbytes at more than twice the recording density of previous IBM disks. The data transfer rate is 1.859 Mbyte/sec. The 4331 accepts 16 drives or 9 billion bytes, whereas the 4341 can handle 32 with the 3880 ... that's a hefty total of 18 billion bytes. The 3770 gives users the most Mbytes/dollar yet from IBM -- 24,402.

- Software pricing looks like "the nose under the tent." While licenses and updates and fixes will still be free for SCPs, IBM is levying a charge for on-site support on all class 1 SCPs running on IBM CPUs. The fee for SCP support is based on the type of CPU, not the number or type of SCPs the user has.

- There will be different charges for program products. Whereas the user previously paid one license fee and received license and support, these will be separate charges which generally equal the old license fee A user paying only for a license will get telephone support free but will pay for on-site visits on a per-call basis (currently $70/hour). A user paying both the license and support fee receives the same type of service he always got, i.e. on-site support, for problems not resolved via phone.

- IBM is implementing an additional monthly charge on both SCP and program products that enables a user to retrieve remotely run software and have it maintained at the central site.

- A telephone support center, staffed around the clock to answer questions, is being phased in beginning this month. IBM tested the concept with 300 users for a year.

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- Remote diagnostics are coming of age. The 4300s offer a remote support facility for IBM customer engineers that permit analysis via instruments plugged into the phone line. Still another feature is the support processor, included in the price of the 4300 CPUs, that is a separately powered subsystem to automate and simplify diagnosis. It has its own display console and the processor generates an eight digit reference code for self diagnosis. Thus IBM should be able to do more maintenance with fewer people.

- The 3033 attached processor with its host provides internal operating performance 60% - 80% faster than a single 3033. The AP is a less expensive method of gaining dual processors than the MP route, but the AP is bound by the current 16 Mbyte memory restriction of the 3033. The MP conceivably could have 32 Mbytes on a system. The AP with 12 Mbytes costs $5.6 million; an upgrade from a single 3033 costs $1.6 million.

- IBM DPD dropped by 20% the price on 370s, while GSD through memory pricing adjustments cut purchase and lease prices of various models. GSD cut purchase prices up to 33% on memory increments for System 3 Models 8, 12 and 15; S/32, S/34, the 5100 and 5110, and two Series/1s -- the 4953 and 4955 as well as on the 3741 and 3747 data station and converter. Purchase prices were cut by as much as 10% on System/3 CPUs, and up to 15% on selected peripherals.

Model	Purchase	24-mo Lease	MMMC	SCP Support
4331 & 512K	$ 65,000	$ 1,585	$ 150	$ 200
4331 & 1M	72,500	1,775	160	200
4341 & 2M	245,000	5,975	475	570
4341 & 4M	275,000	6,725	515	570
Typical systems:				
4331	141,378	3,572	530.50	200
4341	644,545	16,707	2,420	570

The 4331 includes: CPU & 1M, 3262 printer, two 3278 displays, two 3310 disks (130M), one 8809 tape drive, disk, tape and communications adapters, 1,200 bit/sec communications line, console and keyboard.

The 4341 includes: CPU & 2M, 3203 Mod 5 printer, two 3370 disks (1,140M), four 3340s (280M), 3880 disk controller, four 3420 tape drives, 3803 tape controller, card reader, card punch, console and keyboard.

Take a look at the steep slope of prices over the years. When the 138 and 148 were announced in June, 1976, the CPU and memory carried pricetags nearly double what they are today. When announced, a 1M 138 cost $435,000, and now sells for $271,260. The 4331 with 2M, rated by IBM as up to 3.2 times faster than the 138, costs $245,000. The ratios of CPU and memory price to the entire system price appear nearly constant.

Architecture suited for communications

With its hardware and software features, the 4300s appear suited for the communications that are a necessary part of distributed data processing. Possibly more emphasis is being placed on the smaller 4331 for the DDP world be-

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NOSE UNDER THE TENT

There has been a sharp shift in the source of shekels for IBM as a result of the pell-mell rush to buy 303X instead of lease. And this has caused some consternation to the money-handlers at Armonk of late, as they see more and more of the revenue coming up front instead of dribbling in at a steady rate over a period of time.

The 1978 annual report shows revenues from sales grew at a 19% rate over the 1977 figure whereas revenues from rentals and services grew at a 10.4% rate. As a result of the hefty sales in 1978, sales accounted for 41.5% of the revenue from sales, rentals and services compared with 39.1% in 1977.

With hardware prices declining, revenues from sales could indeed remain even or decline unless the market proves sufficiently elastic to overcome this possibility. Indeed, with semiconductor technology making itself useful in so many ways, more and more of the cost of the system lies in the software investment made by the manufacturer. Thus the Giant has implemented a scheme that will increase annual revenues by capitalizing on its software investment.

True, the means by which IBM (other than GSD) will reap these revenues -- which EDP/IR estimates will be about $100 million the first year -- is through support rather than unbundling of operating systems, but surely this is a first step, the proverbial camel's nose under the tent. Look for more support charges eventually.

For the base of 370 and 303X users, the move by IBM appears to EDP/IR to be changing the rules in midgame. The implementation timetable is: SCP, 1981; Program Products, 1980 although customers will be phased into use of the phone support center starting now. Remember, users still will get fixes and updates in the mail. The fees pay for onsite visits

SCP SERVICE FEES

CPU	Monthly Charge	Remote Charge	CPU	Monthly Charge	Remote Charge
370/115	$140	$ 84	4331	$ 200	$120
370/138	285	171	4332	570	342
370/148	435	261	370/158	540	324
370/168	775	465	3033	1,045	627

PROGRAM PRODUCT SERVICE FEES

Program Product	Current License	New License	New Support	Remote Support
Network Operating Support Program	$125	$ 95	$ 30	$ 18
Cobol DOS V3 Compiler	63	58	5	3
Basic VS	385	370	15	9
Host Command Facility	85	60	25	15

In general, the two components, license fee and support fee, equal the price of the old license fee. The support fee is no particular percentage of the license fee, as can be seen from the above prices.

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cause it can function in an office environment whereas the 4341 needs the typical computer room accommodations.

As is usually the case, neither machine contains all the nice features. The 4331 fits in an office environment and has a low cost, integrated communications adapter that can handle up to eight communications lines, thus sparing channel costs until one needs more lines. The 4341 has the 3880 disk controller, which is a separate box that appears to have a storehouse of potential.

The 4331 communications adapter sells for $3,080 or leases for $77/mo. The I/O data transfer rate is 64K bit/sec and its outstanding feature is its ability to handle concurrently on the same processor any two of the following protocols: bisynch, SDLC or start stop. The choice of protocols must be specified when ordering the system. The 4331 contains no channels in the standard price. Up to one byte and one block multiplexer may be added. They cost $4,400 and $3,520 and lease for $110 and $88, respectively.

The 4341 uses a 3704/5 controller, so its capabilities are the same as those on the 370. The 4341 comes with one byte multiplexer and two block multiplexers as standard. An additional group of three block multiplexers may be added for $16,150 or $404 lease.

Software

A new operating system, DOS/VSE, is a "major extension of DOS/VS and incorporates new functional and I/O support," according to IBM. The elements, all of which carry monthly rental fees, are:

ACF/VTAME is heralded as "a major new program product designed to support the 4331 communications adapter for SDLC and bisynch protocols." It combines facilities of VTAM and Network Control Program -- $95.

For BTAM users, there is BTAM-ES, which provides the start stop and bisynch capabilities for the 4331. It adapts Btam for use with DOS/VSE -- $20. Btam was free on 370s.

VSE/POWER release 1 and 2 is another communications oriented piece of software. This provides basic spooling and scheduling for remote job entry under DOS/VSE, bisynch multileaving and allows transmission of jobs and or output between different installations running VSE/POWER. The second release allows sharing of queue data and account files among different machines -- $40.

The inclusion of start stop and BTAM appear but one more indication of IBM's willingness to accommodate older equipment within its newer networks.

And now the disks

There's a new sexy disk out, but it won't run on 370s or the 303X, and neither will its super intelligent controller, the 3880. The 3770 disk is 571 Mbytes. Its head is made by a semiconductor process (and most likely contains a good bit of intelligence). The transfer rate is 1.859 Mbyte/sec and the capacity, 571 Mbytes, represents more than twice the recording density of previous IBM disks. The 3770 raises to 24,402 the number of bytes/dollar available on disk from IBM, nearly double that of the 3350. The unit costs $35,100 and leases for $900.

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The 3310 finally came out from the bundled offering in the System/38 and stores 64.5 Mbytes at a cost of $12,960 for the first disk and $10,260 for the others. The 4331 and 4341 accept older disks. Interestingly, the 4331's integrated adapter will handle the 3340, while the 4341 requires the 3880 controller for the 3340. The 3350 can be used on the 4341 -- with its 3830 controller. The 4331 accepts the 3370 and 3310 as well as the 3340 and 2300. The 4341 will take the 3370, 3350, 3340 and 3344.

The 3880, with its microcontroller chip "personalized and programmed to assist in directing the flow of data and handling communications within the channel," probably has the potential to increase greatly the throughput of the 4341 by conducting the fast data transfer rate of the 3770. But its current function is to provide two separate data paths into the 4341 for improved work load balancing. Right now the data transfer rates are the same as the 370s'.

But there is capability within the 3880. It sells for $62,350, nearly as much as the $65,000 price of a 512K 4331, and costs as much to maintain as a 1M byte 4331, so there's obviously some complex power in there. The microcontroller chip is signal compatible with TTL circuitry and "builds on the base of bipolar technology used for the pocessor logic. The chip is fabricated from a masterslice of over 1,400 gates and includes more than 14,000 components." Typical internal switching delays are 1.5 nsec. "As part of the 3880, the chip can execute more than 5 million instruction/sec and has 94 I/O signal lines, built-in error detection circuits, 16-bit micro instructions and eight bit data words....The instruction set is rich in branch and register-oriented instructions while placing less significance on arithmetic operations." The chip was a joint effort between East Fishkill and San Jose.

The 3880 is an example of what quite possibly is the most significant capability being revealed: the ability to design and fabricate chips tailored to specific functions. Mention was made of IBM's electron beam lithography techniques when the 8100 was announced, and there will doubtless be other devices of the 3880 ilk for other functions.

Main memory

The 4300s use the 64K chip but package it in 512K units instead of the previous IBM high of 256K in the System/38. With concern mounting in the industry about testing complex devices, IBM's approach is to put in "redundant bits to enhance manufacturing productivity." The chip "contains functions such as timing and addressing, and there are also two eight-bit high-speed buffers on the chip that are capable of a bit data rate of 100 nsec. Coupling this fast data rate with the ability to read up to 72 chips at one time results in increased memory access speeds at the same level." Looks like 4M bits can be read at one time.

Curiously, IBM wouldn't divulge CPU and memory cycle times on both CPUs. The 4341 does contain 8K of cache. The 4341 CPU cycle time is 150- 300 nsec with an 8 byte parallel data flow within the processor as well as 8 byte wide data flow between memory and channel. The 4331 memory read cycle is 900 nsec for four bytes and memory write is 1,300 nsec for four bytes.

Shipments start in the second and fourth quarters this year for the 4331 and 4341, respectively. Estimates of the popularity of this new series will be easier to make when we see what other models IBM will unveil.

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• EXXON'S AT IT AGAIN, THIS TIME WITH LASERS. Exxon, which is already making its mark in various fields such as office automation and speech recognition, introduced a family of tiny semiconductor lasers that use an aluminum-gallium arsenide laser and fit into PC boards and optical fibers. Exxon anticipates the devices will find uses in areas such as optical memory storage, non impact printing, facsimile systems, POS gear and communications.

• THE ANTE WENT UP AND AMDAHL DROPPED OUT. That's the story with the bidding scene between NCR and Amdahl over Comten, maker of IBM-compatible front ends. NCR originally bid $22 a share for Comten and then Amdahl got into the act with a $26 a share bid. NCR raised the ante to $26 in cash, and Amdahl withdrew its offer, which was for stock. For the nine months ended Sept. 30, Comten earned $3.4 million before special credits on $38.3 million revenue.

• IBM ELIMINATES DEADLINE FOR PURCHASE OPTION ACCRUALS. The only limitation now is the 50% maximum on purchase credits. The move may be designed to encourage 370 purchases in the face of the new 4300s.

• CSC NETS $221.5 MILLION DEAL WITH SAUDIS. Computer Sciences Corp. signed a five-year contract with the Saudi Arabian Ministry of the Interior to provide a nationwide computer information system. CSC will be responsible for supplying all computer and communications equipment, programs and buildings for the teleprocessing network and training employees.

• UNIVAC ENHANCES ITS UTS 400 intelligent terminal to play a more active role in the distributed scheme. A Cobol compiler resident on the 400 can execute programs that are down line loaded from a host along with a microprogrammed interpreter. Univac also endowed the 400 with a Screen Management system that is bundled; the compiler costs $65-95/mo. For security, a mag stripe reader can be attached to a 400 to prevent unauthorized access.

• STILL ANOTHER PCM TURNS TO OTHERS FOR MARKETING. This time it's Cambridge Memories, which has signed Telex Computer Products, Inc. to market and service Cambridge's add-on memory and IBM compatible CPUs. With the addition of the CPUs to its line, Telex says it can supply all system components.

• NOT QUITE AS MUCH AS EXPECTED, but Amdahl did react to IBM's memory price cuts to $75,000/M byte (EDP/IR,Dec.13) by dropping its memory price about 17% to $70,000/M byte. The drop accounts for an approximate 9% reduction in systems prices.

• EXIT DISK MANUFACTURING AT CALCOMP with the finding of a potential floppy operations buyer in the form of Billings Computer Corp., supplier of small business systems. The price -- about $1.8 million. Calcomp has completed the sale to Xerox of the remainder of its disk business.

• DATA 100 TO MAKE OKIDATA DISKS. In a move to position itself within the confines of the Northern Telecom empire, Data 100 acquired rights to manufacture and distribute Okidata Corp.'s Winchester type disk drives. For use in Data 100 and Sycor systems. Data 100 also has U.S., Canada and Western Europe OEM marketing rights to the disk line. On another front, Data 100 recently stopped making its 600 line/min printers but continues to make slower printers.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" JANUARY 15, 1979 • VOL.14,NO.15 P.J.MCGOVERN,PUBLISHER

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MAKERS POISE SUPERMINIS FOR COMMERCIAL MARKETS

Ringing in the New Year, two minicomputer makers have topped their lines with more powerful systems that have extensive networking capabilities linking their terminals with IBM systems as well as other related systems. Prime Computer, Inc. uncorked four 32-bit models, all with similar prices and improved performance vs. its existing 16-bit models. Univac, in its first major announcement from its minicomputer land since taking over Varian Data Machines in June 1977, heralded an evolutionary upgrade to the current product line. Both announcements are indicative of what EDP/IR sees as strong trends:

- Superminis are catering increasingly to the commercial market. Both Prime and Varian have emphasized compatibility throughout their families of processors, as do mainframers. In addition, Prime has intentionally built in extra power to facilitate ease of use in various activities.

- Price/performance ratios are improving -- in superminis as well as minis. Data General recently introduced a new Nova line with smaller price tags -- a move that may be designed to undercut the would-be plug compatibles.

- Networking software is tying minis with mainframes, other minis and IBM systems. Terminals to the Prime and Univac offerings can be linked to remote IBM systems. Univac extended its Distributed Communications Architecture to the new V77-800 as well as the current V77-600, thus following Honeywell's move of making its minis an integral part of its distributed processing offerings. Prime unveiled Primenet, a packet switching scheme that requires no modifications to existing programs.

The Prime announcement throws down the gauntlet to other minimakers to decrease the price differential between their 32- and 16-bit machines. How about it, DEC and Perkin-Elmer?

Both Univac and Prime minis have substantial portions of their installed bases in the engineering and scientific communities, but both are finding the commercial marketplace more receptive and are spending more effort courting the commercial user. Many superminis are being used to offload mainframes.

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Prime adopts 32-bit structure

The four new Prime CPUs, the 450, 550, 650 and 750, feature 32-bit architecture, cache memory, MOS main memory and microprogramming. They retain Prime's virtual memory features of the current processor line which give each user 32 Mbytes of virtual address space.

A Prime spokesman touted the 750's performance when multilanguage capability is needed. "In multi-user, multi-lingual environments, Fortran performance is unmatched by any comparable systems, and its single-user Fortran performance is roughly comparable to that of Digital Equipment's VAX-11/780, and similar systems," he said.

An instruction prefetch unit on the 750 prefetches up to four instructions. It accesses cache independently of the processor, forming the effective address in parallel with instruction execution. Other features include burst mode I/O that has an 8 Mbyte/sec data transfer rate, and interleaved memory that provides 64-bit data transfers during burst mode I/O.

The Prime 650 is designed for large-scale interactive processing and computational T/S systems and is also suited for distributed processing applications that off-load mainframes, the company said.

PRIME'S NEW CPUS

	750	650	550	450
Cache Size (bytes)	16K	2K	2K	2K
Cache Speed (nsec)		80	80	80
Hit Ratio	95%	85%	85%	
Instruction Prefetch	yes	no	no	no
I/O Transfer Rate/sec	8Mbyte	2.5Mbyte	2.5Mbyte	2.5Mbyte
Floating Point Unit	yes	yes	firmware	firmware
Business Instructions	hardware	hardware	software	software
Maximum Main Memory	8 Mbytes	4 Mbytes	2 Mbytes	1 Mbtyes
Maximum Disk	7.4Gbytes	2.4Gbytes	2.4Gbytes	2.1Mbytes
Interleaved Memory	64 Bit	32 bit	32 bit	32 bit
Price Range ($)	180K - 300K	150K - 250	95K -175K	35K in volume
First Delivery	Summer '79	immediate	immediate	April '79
No. users	63	63	63	32

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SUPERMINIS

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Features / Model	Maximum Word/Instruction Length	Cache Size Bytes	Main Memory Cycle Time	Maximum Main Memory Bytes	Virtual Machine	FP Unit Standard	Low End System
Prime 750	32/48	16K	600 nsec	8M	Yes	Yes	$130K, 256KB, 32MB disk, console, Primos
Prime 650	32/48	2K	600 nsec	8M	Yes	Yes	$95K, 256KB, 32MB disk, console, Primos
DEC VAX 11/780	32/32	8K	600 nsec	2M	Yes	Yes	$128K, 256KB, 56MB disk, console, VAX VMS
DEC PDP 11/70	16/16	2K	1000 nsec	2M	No	No	$101K, 256KB, 176MB disk, tape, console, RSX-11M
Perkin-Elmer 8/32	32/48	No	750 nsec	1M	No	No	$89,900, 512KB, 10MB disk, tape, console, OS-32, Fortran 7, utilities
Harris 570	24/24	2K	300 nsec	2M	Yes		$276K, 2MB, 300MB disk, tape, console, commo
HP 3000-III	22/64	No	700 nsec	2M	Yes	Yes	$115K, 256KB, 50MB disk, tape console, OS, lang.
SEL 32/7760	32/64	No	900 nsec	16M	No	No	$104.7K, 512KB, 80MB disk, tape, printer, card reader, RTM, console
DG M/600	16/32	No	800 nsec	2M	No	Yes	$121K, 256KB, 50MB disk, tape, printer, console AOS
HIS 6/57	16/48	8K	550 nsec	2M	Yes	No	@$80K, 128K, 10MB disk, console, 300 lpm printer
Univac V77-800	16/	1K	600 nsec	2M	No	No	$135K, 256KB, 60MB disk, 8 CRTs, line printer, tape, console, Summit

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"Users of Prime 650 system can expect instruction execution times for single and double-precision floating point arithmetic to be comparable to those of the considerably more expensive IBM System 370/158," a spokesman said, adding, "Its Cobol performance is unmatched by any minicomputer available today."

Moving down the line, the 550 is more powerful than the Prime 500 for most applications and costs less. Prime ranks it with more power than the Decsystem 20 family, Data General's Eclipse M-600 and Hewlett-Packard's 3000 III.

Courting the systems house market, Prime has unveiled the 450, which has a pricetag of $35,000 for orders of 35 or more per quarter.

New	Prime 750	$130,000	650	$95,000	550	$70,000	450	$35,000
Old	Prime 500	$130,000			400	$69,600	350	$35,000

One of the underlying reasons for the added power and speed of the new Prime processors is the expectation that users will eat up cycles with applications such as networking and with schemes that make the system easier to use or even usable by novices.

Primenet uses packet-switching

Primenet, based on X.25 protocol, allows Prime CPUs to communicate with one another, with other vendors' CPUs, and with terminals attached to packet switching nets. The networking scheme can be used on the Prime 750 down to the 350. The three facilities:

- Inter-Program Communication provides full-duplex communication between programs on multiple CPUs in various locations. Users can share programs or divide the execution load.

- Interactive Terminal Support can reduce the number of dedicated asynchronous ports required for terminal interfacing. Terminals attached to other Prime systems or to a packet switched net can communicate with a program operating under Primos, Prime's operating system.

- File Access Manager allows network users to read and write files on other Prime systems in the net without worrying about their location or structure.

Primenet has a number of elements. For local nets, the Primenet without X.25 can link eight CPUs and costs $5,000. A node controller goes for $3,000.

The packet network interface costs $7,000 and the entire Distributed Processing Terminal Executive package that provides 3271-3277 communications costs $12,000. The communication is bisynchronous and does not support SDLC. A synchronous multiple data line controller interface adds $5,000 to the bill.

In addition to communicating with other vendors' mainframes via the X.25 interface, Prime remote job entry emulation packages support IBM 2780-1 and Hasp, CDC 200UT, Univac 1004, and ICL 7020.

A layered architectural design facilitates adaptation to new standards, and Primenet can support a variety of protocols, the company said. One level provides user services including interactive terminal support.

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More languages, facilities

Prime unveiled some new languages and facilities such as Prime power, an interactive data management facility that is said to simplify data query, reporting and maintenance tasks. It's priced at $7,500 and $12,500. A source level debugger costs $1,500. Ansi 77 Fortran costs $4,500 and Ansi PL/1 subset has a $5,000 price tag. The full PL/1 will cost $12,000 when available in June. The company continues to bundle its operating software, Primos.

Prime also resurrected its User Protection Plan which guarantees users a two-year trade-in plan at specific prices.

Varian link in Univac net

Univac's top-of-the-line mini, the V77-800, is an "evolutionary extension" of the V77 line and has a faster main memory, 600 nsec, 1K of 150 nsec cache and 6K bytes of control store for processor sequencing. 12K of writable control store is optional. CPU cycle time is 150 nsec. The 16 bit processor can have up to 2 Mbytes of memory. Prices range from about $135,000 with 256K, eight CRTs, floating point processor (which sells for $4,000) 60 Mbytes disk, printer and mag tape and Summit operating system. $181,000 includes 512K bytes, 16 CRTs and the same configuration as the previous one with the addition of Cobol, Fortran and Total. Firmware accelerator packages are available to complement the software.

The Summit is a multi-task terminal oriented operating system that also runs on the V77-600. The charge is $6,000; a Pascal package costs $2,000 and QL/77, an inquiry/update language used in conjunction with Total, is $3,000. Summit also supports Cobol, Fortran IV, Fortran 77, RPG II and assembly.

Univac's top two minis support the company's Distributed Communications Architecture, through which one can have a multivendor network. Distributed Processing Modules that link minis with either IBM or Univac CPUs cost $4,000 each. Features of DCA include Pronto, a transaction processing module; remote batch/job entry capability; user application interface to network resources and local network resource management.

Since acquiring Varian in June, 1977, Univac has doubled the number of employes to 1,037 and development and manufacturing floor space to 315,000 square feet. Shipment rates have nearly doubled, the company said.

Data General upgrades Novas

Data General showed that it has learned lessons of price reduction that result from being in the mini business for some time. The new range of Nova 4s appears to be a signal to the plug-compatibles such as Lear-Siegler and Fairchild Camera and Instrument et al that DG entends to fight -- both in the courts (EDP/IR,Oct. 30) and in the marketplace -- to preserve its share.

The Nova 4s are software compatible with the 3s and have the same operating systems -- RDOS, RTOS and DOS -- as well as IBM 2780/3780 and Hasp II emulators.

- Nova 4/C packs the speed of a Nova 3 on a single board, and includes 64K for $3,500.

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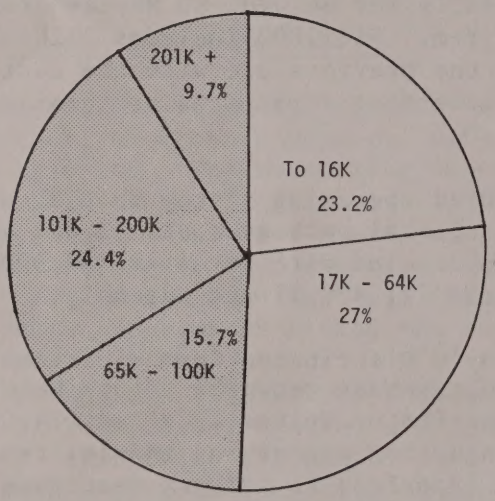
- Nova 4/S, a two-board machine, features 50% higher speed than the Nova 3 and costs $7,600.

- Nova 4/X, with up to 256K, also features 50% higher speed than the Nova 3 and with a disk, tape, printer and four CRTs costs $56,886. The system supports dual operations under RDOS with foreground/ background protected from each other. A review of 64K CPUs:

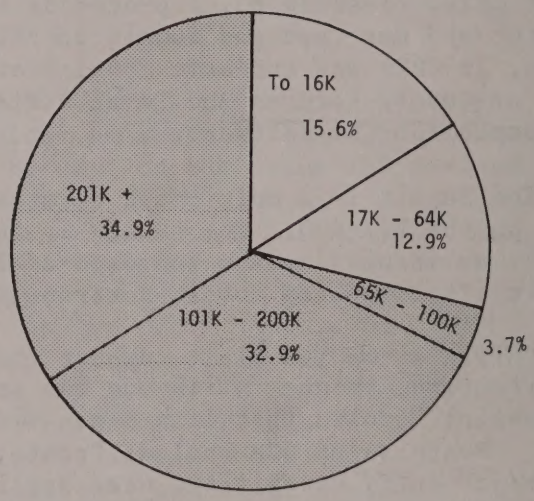
New	Nova 4/C	$3,500	4/S	$7,600	4/X (battery backup)	$57,386
Old	Nova 3/4...$4,350		3/12	$9,050	3/D " "	$75,160

The Nova 4/S and X include features such as a 400 nsec memory with fourway interleaving; a pre-fetch processor, an optional floating point unit that's faster than DG's previous units as well as a Memory Management Unit.

MEMORY SIZE OF SUPERMINIS IN U.S.
(Copyright 1979 -- International Data Corporation)



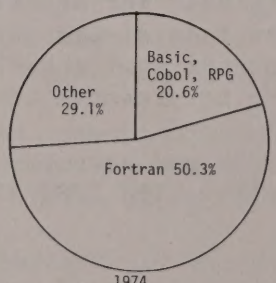
1975



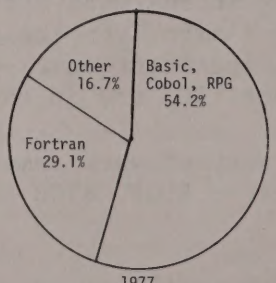
1977

The appetite for memory appears ravenous and there are no signs that it will diminish in the foreseeable future. In 1975, less than 50% of superminis installed in the U.S. contained over 65K of main memory. By 1977, 71.5% of the installed base had over 65K.

PRINCIPAL PROGRAMMING LANGUAGES ON U.S. SUPERMINIS
(Copyright 1979 -- International Data Corporation)



1974



1977

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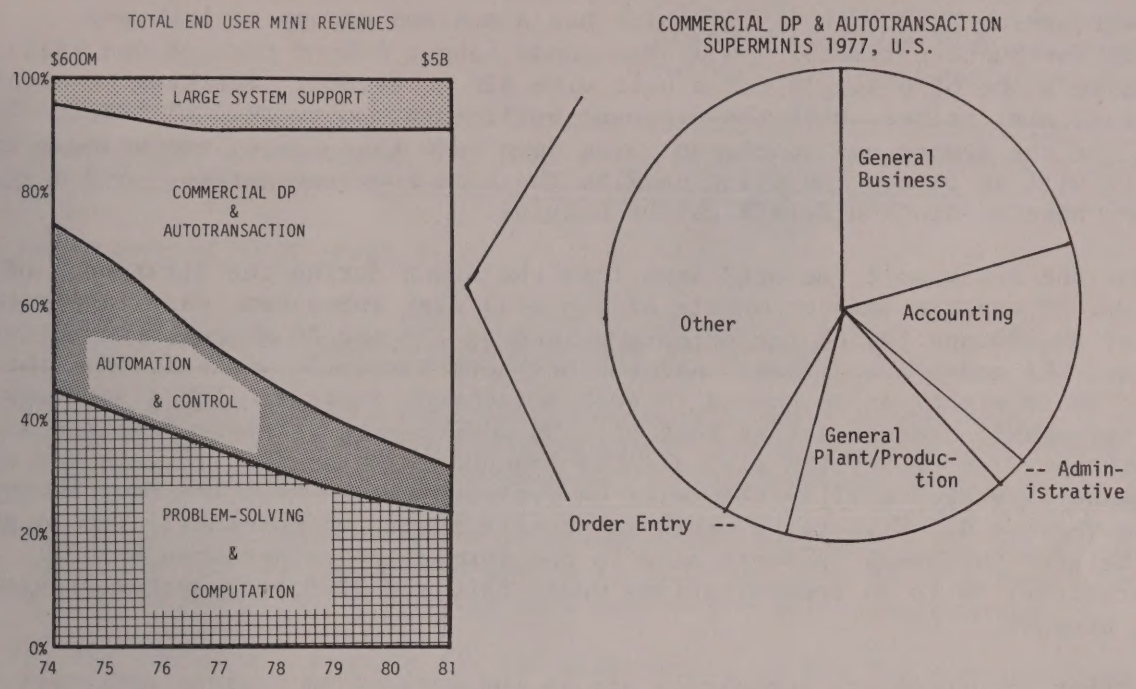
SHIFT IN SUPERMINI USAGE

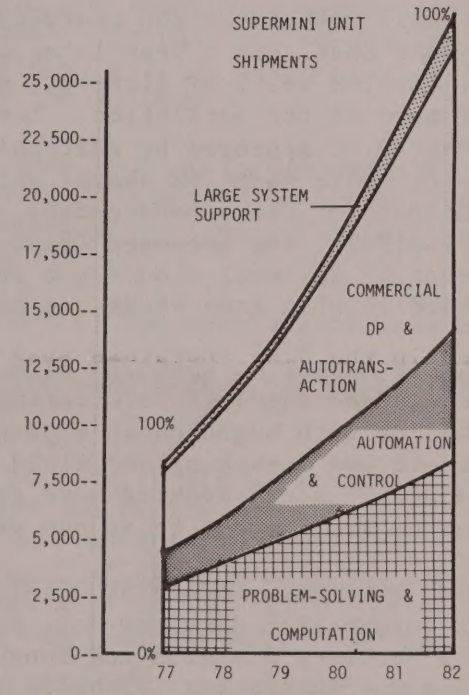
(Copyright 1979 -- International Data Corporation)



The commercial DP and autotransaction segment is the fastest growing segment of the supermini market as users and vendors alike discover that the machines come in mighty handy offloading mainframes. Although many makers thought they were installing machines for specialized number crunching applications, a later look reveals that users are finding the minis versatile components of their DP operations.

And, with the change in use come different languages. The chart on Page 6 shows that the business-type languages are outpacing the growth of Fortran and other more scientific languages. In addition, the use of multiple languages is climbing rapidly indeed..

An IDC study of the supermini market found that 65% of sites surveyed in 1977 used two or more languages and of these, 30% used three or more languages.



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• GSD's MEMORY PRICE FALLS TO LESS THAN 2 CENT/BYTE, matching DPD's. The news this time comes from the General Systems Division in its announcement of a slower Series/1 CPU, the 4952, which has a maximum memory of 128K and average instruction time of 9.4 microseconds (about 80% of that of the 4953). The basic price of a single board unit with 32K is $4,600. Starting to sound like real mini prices, with the discount built into the price. If indeed IBM's got the memory and processor costs down into this range, one wonders how long it will be before the Giant tackles the home computer market. And a broader base of stockholders might be helpful.

But the S/1 wasn't the only news from the Giant during the first part of January. There are smaller models of the 4963 disk subsystem, carrying price tags of $9,980 and $9,260 for primary drives of 23- and 29 Mbytes, respectively. And the add-ons are less. And the S/1 gets System/34 workstations, the 5250. Up to eight can be hooked to each attachment feature. IBM also threw in programmable communications control. In addition to software features such as Fortran IV compiler, IBM also quietly announced the availability in May of a command language facility that will be included in the Realtime Programming System Version 4. With this, users may create their own commands. The 34 got some belated Christmas presents also in the form of 16 rather than 8 local workstations; 34 to 34 communications under SDLC and 3270 host system programs using bisynch.

Other announcements supposedly are in the works from various tentacles of the Giant. For instance, how about facsimile equipment from Office Products Division and the long-expected E Series from Data Processing Division. Could be the E pricing will be based on charging for each transaction. That could make things interesting, indeed.

• IBM PLAYS POPULARIST AND PROPOSES HIGHER DIVIDEND AND STOCK SPLIT. In an announcement that came a year later than predicted by at least one Wall Street analyst, the IBM board of directors made its bid to price the stock within reach of more of the population. The proposed four for one split will take effect May 10 if approved by shareholders at their April 30 meeting. The proposed split would mean IBM shares selling for $67 apiece based on the market price the date of the announcement. The last time IBM stock was priced that low was in 1932. The proposed 19.4% rise in dividends to $3.44 a share from the current $2.88 level should put the annual investment yield in the area of 5% -- which is what many banks are paying for their accounts.

• MAGNUSON MARKETING ADDS T/S FIRM TO ITS RANKS. Scientific Time Sharing Corp., which announced it is offering a CPU along with its APL based software, has linked up with Magnuson in a joint marketing agreement. Both companies retain their own marketing and field support organizations. With the 370 plug-compatible scene looking more crowded, the scramble for linkups with time-sharing firms seems to be one way to keep out of the cold.

• GE AND HONEYWELL IMPLEMENT JOINT VENTURE IN T/S. The new venture, General Electric Information Services Co., combines worldwide operations of GE's Information Services Division and Honeywell's T/S marketing operations in the UK, Europe and Australia. GE holds 84.1% with Honeywell having 15.9% of the new company. Previously Honeywell had distributed GE's Mark III service in those overseas markets.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" DECEMBER 27, 1978 • VOL.14,NO.14 P.J.McGOVERN,PUBLISHER

IDC pegs power of CPUs--Page 2

IDC LIBRARY

1978 -- YEAR OF THE PCM; MAKERS, MODELS, BASE PROLIFERATE

Producing hardware doesn't seem to be the complex matter it once was. Witness the number of new CPU suppliers entering the market in 1978 -- more in one year than in recent memory, reminiscent of the minicomputer frenzy awhile ago. No fewer than six companies announced their intentions to partake of the IBM look alike pie, otherwise known as plug compatible machines. The established PCMs spent the year revamping and adding to and repricing their lines. The bottom line is more choices for the user and better price/performance.

Perhaps one of the reasons for the mushrooming of the PCM community was the link up with services firms providing hardware to their customers. With services firms supplying support and dealing with the end user, the iron builders can nestle into the traditional OEM role and concentrate on producing in volume and watching their profit margins.

Some unknowns in the picture are the scope and depth of the services hardware market and also how long IBM will tolerate infringements on its territory. When IBM changes the rules, the ballgame will be moved to a different field where the name of the game will be systems software.

The PCM installed base in the U.S. more than doubled in number from 132 at the end of 1977 to a projected 375 at year end 1978, according to earlier International Data Corp. estimates. The PCM share grew from 1.3% to 3.4% of the total U.S. 370 and 303X base during 1978.

By 1980, PCMs should account for nearly 20% of the IBM base of 148s and above in the U.S., IDC predicts, compared with its current 7.3% share. Looking at the IBM base of 138s and up, PCMs' share should grow to nearly 13% from their current 4.4% portion, according to IDC.

The year was also notable for the range in size of PCM offerings. Previously PCMs targeted their efforts on IBM systems of 158 and above, but many have now attacked the 138 and 148 market as well as the smaller 370s. Other notable actions include revamping of lines, many of which were price drops in disguise, and lower memory prices. The latest move was by IBM, which now is shipping memory at $75,000/M byte instead of the previous $110,000/M byte.

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A GRAPHIC LOOK AT IBM PRODUCT INSERTION STRATEGY

For at least the past year, persistent rumor has it that IBM will soon announce a downward extension of its 303X product lineup. And the term most often associated with what is expected to be a series of product announcements is "E Series." These new processors are expected to offer comparable price/performance characteristics to the 303X, probably have more separate pricing of software, and would include upgrade/replacement systems for the 370/115, 125, 138, and 148.

To give readers a frame of reference (or speculation) for these upcoming announcements, EDP/IR has constructed a graphic analysis of how the E Series models could fit into the perspective of relative power vs. date of first installation. The chart(Page 3) is based on International Data Corp.'s continuing task of collecting relative power relationships and normalizing them to a common base. IDC's latest refinements of these numbers (last published just over a year ago) are given below for reader use and further analysis.

RELATIVE PERFORMANCE IBM PROCESSORS

Model	First Install.	Relative Performance	Model	First Install.	Relative Performance
360/30	6/65	2.25	370/158	5/73	41
40	6/65	4.05	158-3		45
50	8/65	9.0	158MP		60
65	11/65	31.5	158-3MP		74
			168	7/73	109
370/115	4/74	2.25	168-3		124
115-2		3.96	168MP		143
125	6/73	4.5	168-3AP/MP		208
125-2		6.3			
135	5/72	9.0	3031	3/78	54
138	11/76	11.7	3031AP		90
145	7/71	18	3032	3/78	124
148	3/77	24	3033	3/78	223
155	2/71	31	3033MP		374
165	6/71	89			
195	3/71	168	E-1	1/80	6
			E-2	1/80	12
			E-3	1/80	20
			E-4	1/80	36

RELATIVE PERFORMANCE IBM-COMPATIBLE PROCESSORS

AMDAHL		ITEL		CDC		NAT'L SEMI	
V/5	130	AS3-3	18	480-1	21	400	18
V/5II	143	AS3-4	24	480-2	28		
V/6	177	AS-4	28			TWO PI	
V/6II	200	AS5-1	41	MAGNUSON			
V/7	290	AS5-3	45			NCSS	18
V/8	360	7031	54	M80/3	17		
		7031AP	85	M80/4	36		
		7032	137				

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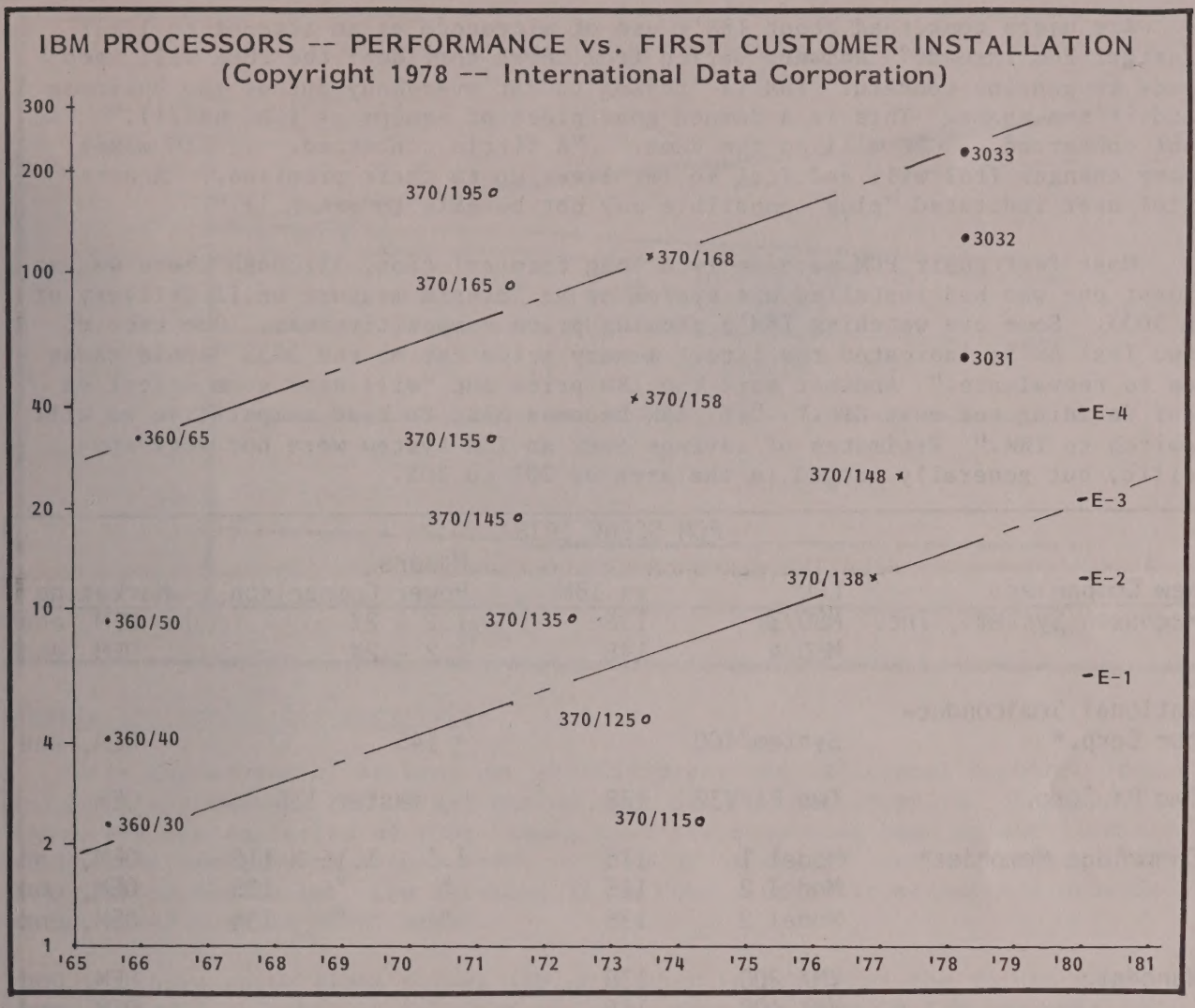

Users happy

Users are happy with the reliability and service of the plug compatible mainframes, according to preliminary results of International Data Corp.'s survey of 50 Itel, Amdahl and CDC users. The reasons for PCM selection include: price, delivery, physical size of system and ease of installation. Many of the respondents citing price as the chief reason for selection were government sites receptive to low bids.

Principal areas of concern in switching to PCM were whether the company would be around in the long term and its ability to provide support. However, several of the sites were already familiar with Itel, so the selling task there was not as great. One user commented: "We leased our IBM from Itel so (we) just switched machines, not suppliers." Another said: "We had been an Itel customer for a long time so had no worries."

In most cases, the PCMs machine replaced an IBM machine. However, there was one first time user. In some instances, Amdahl was selected because no other machine offered comparable performance. Users rated their PCM service fairly high, but several mentioned that their IBM service had declined since they became a PCM site.

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Are users concerned about IBM's use of microcode as an attempt to limit further PCM inroads? Answers varied from those confident the PCMs will keep pace to genuine concern. IBM is "trying to cut everybody out of the business and it's a shame. This is a damned good piece of equipment (CDC 480/1)." "Am not concerned... CDC will do the same." "A little concerned. If IBM makes many changes Itel will and Itel so far lives up to their promises." Another Itel user indicated "plug compatible may not be able to match it."

Most feel their PCM machine is a long term solution, although there was at least one who had installed his system as an interim measure until delivery of a 3033. Some are watching IBM's growing price competitiveness. One user of two Itel AS/5s indicated the latest memory price cut on the 303X "could cause us to reevaluate." Another said the IBM price cut "will have some effect on our deciding our next CPU." "If IBM becomes head to head competitive we will switch to IBM." Estimates of savings over an IBM system were not very specific, but generally ranged in the area of 20% to 30%.

PCM SCENE 1978

New Companies	CPU	vs IBM	Makers' Power Comparison	Marketing
Magnuson Systems, Inc.	M80/3	138	1.2 - 2X	OEM, end
	M80/4	148	1.2 - 2X	OEM, end
National Semiconductor Corp.*	System/400		= 145	OEM, end
Two Pi Corp.	Two Pi/V32	138	=, faster 138	OEM
Cambridge Memories*	Model 1	115	1.1 - 1.15 X 115	OEM, end
	Model 2	125	" " 125	OEM, end
	Model 3	135	" " 135	OEM, end
Nanodata	VMX 200	138		OEM, end
	VMX 400	148		OEM, end
Citel	30XX Model 3	138		OEM
	30XX Model 4	148		OEM
New Processors				
Itel Corp.	AS/3 Model 3	138	1.4 - 1.8	end
	AS/3 Model 4	148	=, faster 148	end
	AS/5 -3AP			
	AS/5-7031			
	AS/6-II			
Amdahl	V/5-II		10% faster than V/5	end
	V/8	3033	1.5X	
Control Data Corp.	480-2			

* Cambridge and National Semi, although involved in production of systems for Control Data Corp. and Itel, respectively, are now assuming marketing responsibilities for their own versions. In both cases the machines are smaller than those they supply to OEMs.

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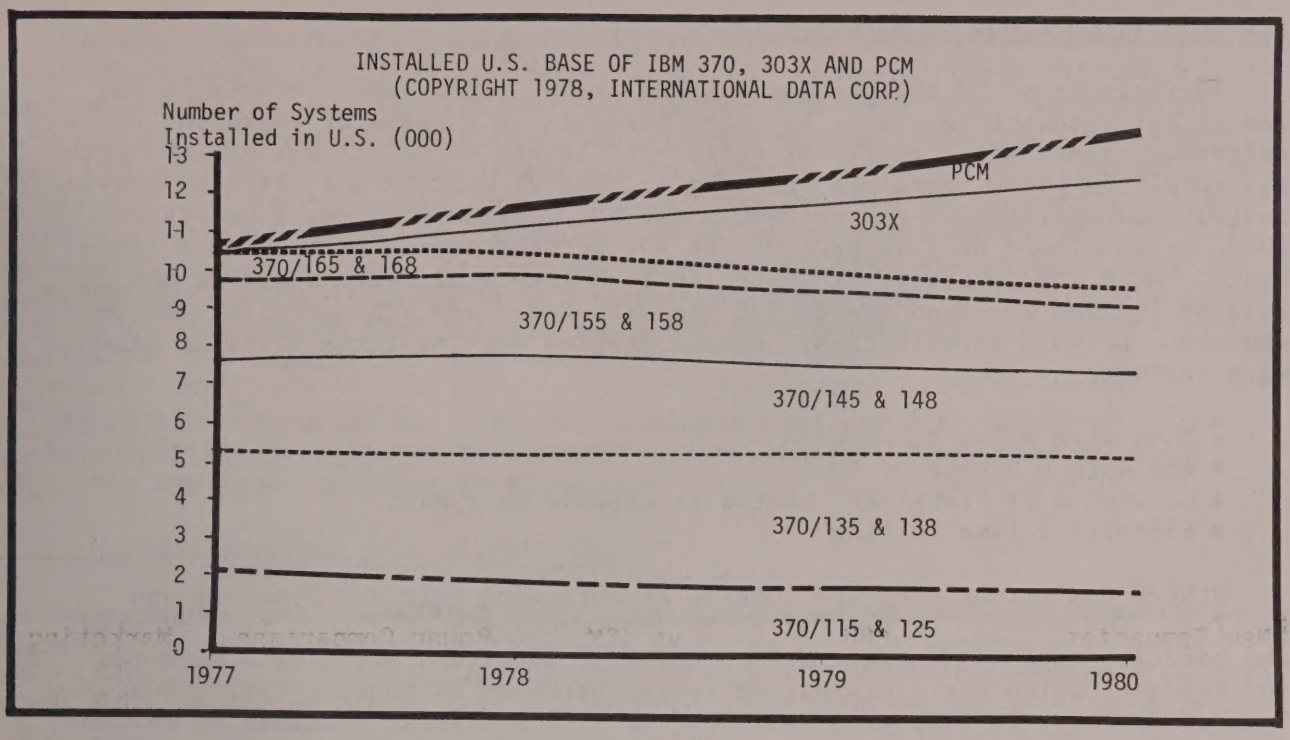

What's the secret for survival?

With the advent of so many new manufacturers and additional machines, one tends to ask whether the market can support all the participants. Basically there are two varieties of PCM: those that are competing head on with IBM and those that are linking with a services firm or other end user marketeer. In the case of the latter, the services firms have a specific market and provide value added such as NCSS' Nomad.

But those going alone versus IBM must bear in mind that the future game plan includes the ability to adapt to or counter any changes IBM may make in systems software and pricing thereof. Amdahl and Itel already have indicated they intend to be as proficient as necessary in this area. Amdahl has introduced its MVS/SE assist and VM/Performance Enhancement. The latter enables users to run both MVS and VM/370. MVS throughput might be greater than 90% of MVS native state, Amdahl said. Itel has put Virtual Machine Assist firmware on its AS/6-2, which supposedly cuts CPU cycle utilization 10% to 20% under VM/370. These two PCMs have shown they have firmware capability.

With all the new varieties of machines introduced in 1978, one should not overlook the fact that many are reworked versions offering either lower price tags or improved price performance compared with previous models.

Now that so many have jumped into the pool, the scenario should change with the entry of IBM's "E" series, which is expected to be introduced in late January with a couple of models in the lower end. The E should represent IBM's major stepping stone toward unbundled operating systems on DPD's products. In addition, EDP/IR expects the operating system will be a further step down the path to a system that is not easily replicated by PCMs. For starters, the operating system, if unbundled, will not be in the public domain. And there will be optional selectable units of firmware that provide a system different from the current 370 operating system.

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Services firms trend to hardware

Services firms in the problem solving arena joined their cohorts in the remote autotransaction sector by using hardware as a means of marketing their software. There are a couple of different flavors of offerings, but the overall result is these firms are catering to captive markets and offering proven software capabilities. For instance, the ADP "Onsite" system, a Decsystem 2020, is available only as part of the ADP service and is offered on a lease basis. NCSS, by contrast, is trying to look like a hardware supplier and is selling its Two Pi-based system for use with Nomad and VPS operating system and other network capabilities. Remote problem solving firms offering hardware include:

- NCSS with a Two Pi machine
- ADP with a Decsystem 2020
- GE with a TI "terminal" that's as capable as a mini
- Scientific Time Sharing

Others indicating they are looking at following suit are Tymshare and On-Line. The vendors in the remote autotransaction sector that have adopted the hardware approach include McAuto Hospital Services, Reynolds & Reynolds and Keydata, which has a standalone system based on DG Novas. Itel's Business Systems Division is targeting Data General's CS series at branches of Fortune 1000; the system is principally standalone.

The link by PCMs with services firms would seem to significantly lower the barriers to entry by new firms because the services provide the value added software and also customer handholding.

Communications grabs limelight

In the communications arena, there was some unexpected action and some expected inaction. The Computer Inquiry II's reluctance to grapple with the issue of what constitutes the dividing line between the unregulated computer scene and the regulated communications scene was expected but nonetheless disappointing. And so we wait for 1979 to unfold.

However, there was quite a bit of action both on the regulatory and the legislative fronts. A reading of the tea leaves shows that the days of the Consent Decree of 1956 appear to be numbered. A principal provision of the Communications Act of 1978 would eliminate the restrictions embodied in the Consent Decree regarding competition in the communications industry. Basically the legislation calls for the abolition of the FCC and the creation of a Communications Regulatory Commission (CRC) whose guiding principles would be the requirements consistent with a competitive industry. The legislation is expected to be submitted in substantially the same form in 1979.

On the regulatory front, the Supreme Court told Ma Bell in no uncertain terms after many moons of wrangling that it had to provide local loops to upstarts like MCI's Execunet and Southern Pacific's Sprint services.

In a different matter, the FCC took it upon itself to at last make IBM's protege Satellite Business Systems prove why it should exist and that it needs the backing of all three parents -- IBM, Aetna and Comsat. The FCC thinks perhaps there could be more enterprises with fewer partners.

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And the year would not have been complete without Ma Bell's Advanced Communications System (ACS). The service, as proposed, would enable different computers and terminals to talk with one another and would also take care of such matters as where material is filed within a system. In other words, one need only have a "dumb" terminal and ACS to have the services of a "smart" terminal. ACS' target market is the smaller company, and EDP/IR envisions it playing a significant role in revamping the office of the future. Use of electronic mail is going to be like eating peanuts. Once the terminals are in place, there are likely to be loose controls on their use. The basic protocol will be X.25, although AT&T did not close the door on the possibility of accommodating SNA eventually.

Xerox also threw its hat into the communications services ring with a preliminary filing of its Xerox Telecommunications Network (Xten) that is designed to use satellites and FM bands.

Distributed processing gets distributed

Distributed data processing (DDP) continued to one of the most overworked buzzwords of the community, but this year users as well as vendors were doing more implementing. The wave of the future seems to lie in distributed data bases that are organized so that the user need not know the location in order to retrieve data. Datapoint's Advanced Resource Computer (Arc) scheme operates on this principle. IBM joined the crowd and became a proponent of DDP, first with its Series/1 from General Systems Division in Atlanta, and then with full fanfare with its 8100 from Data Systems Division. EDP/IR expects to see more competition between divisions and interactive systems.

Hand in hand with the ability to retrieve data without regard to its location is the trend toward English language-type commands for users. The Tandem system is an example of this high level language capability.

Is there really an office of the future?

Yes, Virginia, there is an office of the future - but there are many versions. On the more sophisticated side, it conceivably can be classified as simply another part of a company that has distributed processing. The lines between DP and word processing (WP) are melding at a rapid rate. The initial thrust seems to be in enhanced typing machines that make up for the fact that few people are entering the secretarial pool with adequate skills. In the low end, the standalone typewriter, Exxon's Qyx is gearing up to give IBM a run for its money. The CRT station is replacing the non-CRT station on manufacturers' production lines and signifies the next trend.

But looking ahead, the copier is being eyed by several companies, Wang and Xerox included, as playing more of an integral role in a comprehensive office system. Xerox has an intelligent copier in the White House and Wang just introduced one that basically eliminates hard copy before duplicates are made.

When one adds the advent of electronic mail, which is coming faster than one might think (there are at least two commercial systems available now, and the Post Office is getting its feet wet also) one can envision linking up the word processor machines, the copier and the communications capabilities into a system where one does not have to worry about protocols (thanks to ACS) and voila, nearly global communications.

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• IBM AUSTRALIA IS "PHASING DOWN" ITS SERVICE CENTERS and expects to be out of that business by 1980, according to a spokesman. The deemphasis on service down under is not exactly new; a few years ago IBM closed down a couple of its centers. The spokesman cited technological advances and lower priced products as the principal motivation for the move. IBM feels it can better serve customers through other product offerings. The move is based on characteristics of the Australian marketplace and IBM has not announced similar moves in other countries, he said.

• MEMORY PRICE CUTS ARE THE RAGE these days, giving users a chance for bigger systems for the same bucks. Honeywell dropped prices on its 16K chips in Level 6 minis by between 15% and 49%. A controller with 64K is now $4,700 instead of $8,400. Other minimakers are also onto the game. Computer Automation has reduced prices up to 42% for its LSI 4/10 mini and memory combinations. In addition, less expensive LSI 4/10 Alpha configurations are available because the use of 16K facilitates the use of smaller memory boards.

• NCR WOOS OTHER USERS, OWN BASE WITH CONVERSION aids. NCR offers a translating service for programs written in RPG and RPG II for IBM, Univac, Burroughs and Honeywell systems which will convert code into Cobol 74 for use on the NCR 8000 series. The service is part of an "aggressive marketing program to tke advnatage of what NCR perceives as lack of compatibility in a number of computer lines," NCR said. For its older base, NCR has Automatic NCR Source Word Evaluation Routine (Answer) software that converts programs written in Cobol 68 to Cobol 74. Thus Century and Criterion users can take advantage of Cobol 74 features.

• TELENET FINDS A SUITOR in the form of GTE. The acquisition bid, valued at $59 million based on stock prices of GTE at the time of the announcement, should give General Telephone & Electronics Corp., holder of the nation's largest non-Bell phone network, some ammunition with which to counter Bell's ACS. Telenet is known for its innovations in the packet-switching arena. The agreement should unburden the balance sheet of Telenet's parent, Bolt Beranek and Newman, which holds about 24% of Telenet's stock. The merger is subject to approval by two thirds of the shares of Telenet. Owners of 55% of shares have approved the bid.

• PERTEC PICKS UP PERIPHERALS CONTRACTS valued at about $10 million from a host of companies. It will supply the French firm Thomson-CSF with nearly $3 million of tape drives while granting a Thomson subsidiary manufacturing rights for a micro-formatter. Pertec will also supply tape drives and formatters for minis from Univac and Data Card Corp. These contracts are valued at $2.8 and $1.2 million, respectively. In addition, Pertec has a $3.5 million contract to supply Lear Siegler, Inc. with disk drives.

• CONTROL DATA SIGNS DISTRIBUTOR FOR MINI OEM PERIPHERALS. CDC signed Kierulff Electronics, Inc. to distribute memory modules, floppy drives and diskettes throughout the U.S. The agreement may be expanded to include other CDC OEM perpherals for mini and micro markets. Kierulff is the first distributor CDC has signed to handle this product line.

• AMERICAN BANKERS ASSOCIATION ENDORSES NBS ENCRYPTION standard, which should lead to broader use of this encryption algorithm.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" DECEMBER 13, 1978 • VOL.14,NO.13 P.J. McGOVERN,PUBLISHER

Transnational data flow barriers growing -- Page 5

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USERS ADOPTING SNA AS IBM RELAXES REQUIREMENTS

Four years ago IBM told the world of its scheme to make its hodge-podge of communications offerings into a coherent entity via Systems Network Architecture. SNA requires a commitment to IBM products and philosophy, and there has been much speculation on how much progress IBM has made in selling this scheme to its user base.

Users are tending toward implementation of SNA, prompted by IBM's lowering of entry barriers to SNA. A survey by International Data Corp.'s Distributed Processing Service of 241 IBM sites -- 3% by number and 6% of the value of the eligible base -- found 40 sites that have SNA on at least one system at a site. IDC estimates as of yearend 1978 there will be 1,250 SNA sites in the U.S., or 13% penetration of SNA by site and 25% by value of systems at these sites.

By yearend 1980, IDC estimates the proportion of IBM SNA-eligible sites using SNA will grow to 24% by site, or 2,500 sites, and 45% by value of systems installed at these sites.

SNA has been called everything from a "blueprint" for IBM's communications scheme to a "gimmick to force users to use IBM products." SNA is an overall scheme that divides communications functions into well defined, logical layers. Among the components are the bit-oriented protocol, Synchronous Data Link Control (SDLC), that permits up to seven messages to be sent before a response is required from the receiving device; and Virtual Telecommunications Access Method (VTAM) which enables remote terminals to access application programs in the host. Another element is Network Control Program/Virtual Storage (NCP/VS) that manages the communications network in conjunction with VTAM.

When announced, use of SNA required the new SDLC-capable terminals such as 3270 and 377X, thereby excluding the masses who had bisynch and start-stop devices. Since then, however, IBM has relented and relaxed the stiff admission price to SNA by allowing the use of other access methods such as BTAM and TCAM and older, non-SDLC terminals. And with the 8100, IBM at last endowed nodes with the power to initiate communications among themselves. In IBM lingo, the Systems Services Control Points are no longer dependent on and driven by the host.

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Some of the steps IBM took to broaden the base of SNA include:

- Advanced Communications Function (ACF), announced but not available in 1976, provides support of multiple computer networks and permits the use of TCAM, with appropriate additional software modules.

- Connection of non-SDLC terminals via:

  + Series/1, which can act as a "poor man's 3705" (EDP/IR,July 14). The mini can handle the older terminals while a 3705 handles the newer variety; thus the non-SDLC devices can be linked into an SNA-type net with the host using BTAM although their protocol need not be SDLC.

  + 8100 supports start-stop terminals on the down-stream end and talks to the host CPU in bisynch or SDLC. The 8100s communicate with each other in SDLC.

- Connection into X.25 nets. IBM made this capability available on a request for quotation basis to those users wishing to link into the Transpac and Datapac (French and Canadian) networks. The capability exists, although it is not broadly offered.

One of the hottest topics of speculation in 1978 is whether IBM will make SNA gear able to talk to X.25. Will IBM continue to use SNA as a "tool" to lock users into its Satellite Business Systems offering? Or will it go half way to meet the explosive demand and use of X.25 that will occur when Bell's Advanced Communications System (ACS) gets off the ground?

A corollary question is who will provide the ability for these systems to talk with each other? Minimaker Computer Automation has a "virtual network" system that enables users to go either way, and EDP/IR expects we will see the independent communications makers offer conversion systems on a broad basis before IBM does. Also, Telenet and other packet switchers will probably have this capability before long if they don't already. Dixon Doll, president of the DMW Group, Inc., thinks networks should provide protocol conversion and would like to see clear lines drawn between computer vendors' and networks' functions, thus eliminating duplication of effort and overhead in CPUs.

Gathering momentum

The momentum of the SNA base is growing at a fast clip, especially when one considers the latest steps to broaden the base. Take a look at the numbers of SNA-eligible terminals and CPUs:

- IDC estimates there will be 1 million editing CRT terminals in the 3270 class installed in the U.S. by 1983. By 1981, 40% of IBM 3270s and 15% of the PCM's 3270-types will be using SDLC.

- By the end of 1978, two thirds of 360s/370s will be running some form of virtual system or virtual machine operating system. And the MVS base at yearend 1978 will be three times that of yearend 1976. This MVS base should be boosted still further by 303X shipments.

- There will be 1,900 VTAM installations by yearend 1978, IDC predicts.

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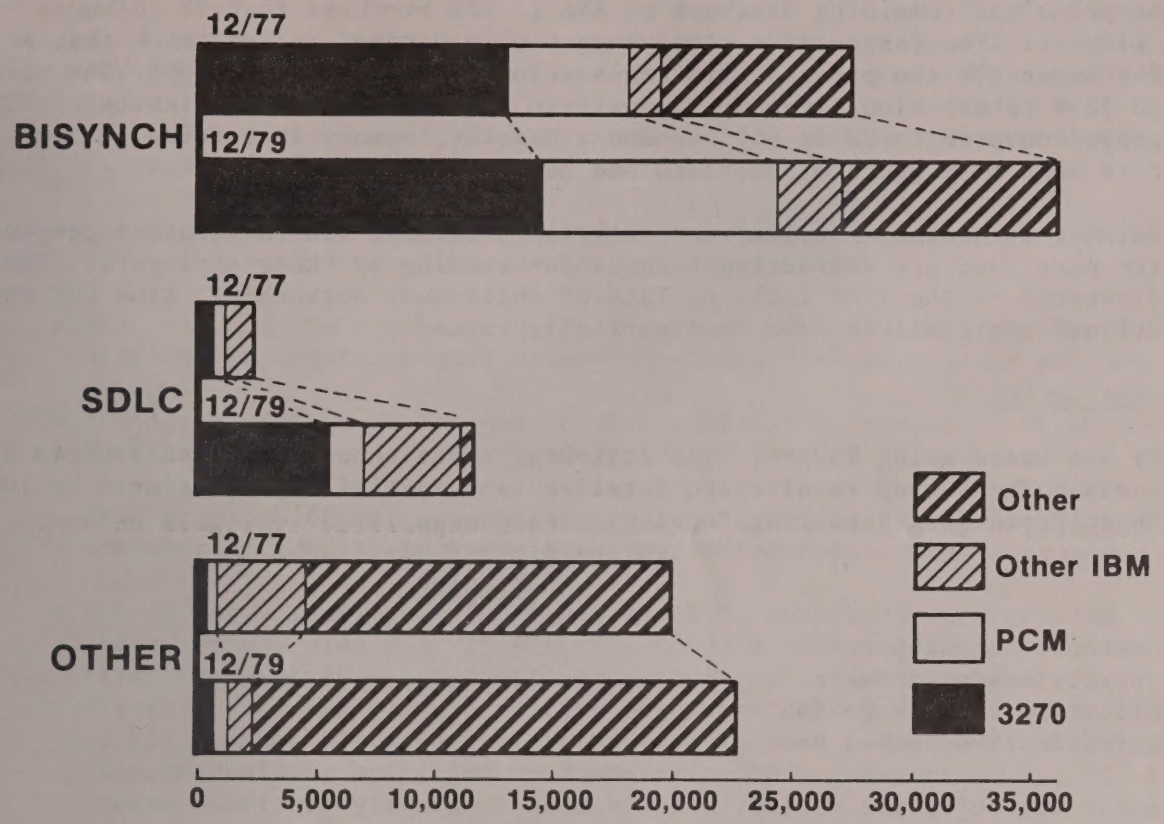
TERMINAL GROWTH BY PROTOCOL



SURVEY SAMPLE
GROWTH IN TERMINALS BY PROTOCOL

	Bisynch	SDLC	Other	Total	Bisynch	SDLC	Other	Total
3270	12,774	510	273	13,557	13,388	5,783	171	19,342
3270-PCM	5,434	501	382	6,317	11,230	1,268	183	12,681
Other IBM	1,853	1,011	3,820	6,773	2,311	3,820	3,894	10,025
Other	7,891		16,154	24,045	8,912	655	18,640	28,207
TOTAL	27,952	2,111	20,629	50,692	35,891	11,526	22,888	70,255

The SNA survey found that 4% of the respondents' terminals installed at the end of 1977 were using SDLC; users expected this figure to grow to 16% by the end of 1979. Again, one should note the survey was biased toward large sites, which is the basis of the SNA market. Twenty three percent of the respondents had 168s and 36% had 158s.

Of the 241 sites, 40 have SNA, 48 plan to use it by the end of 1979, and an additional 46 indicated they have plans to use SNA in the foreseeable future. Thus, there are 134 users out of 241, or 55%, that either use SNA or plan to in the foreseeable future.

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Cited drawbacks to SNA

The principal remaining drawback to SNA is the overhead that VS software brings with it. For instance, a study reported in Datamation indicates that a 370/158-3 under DOS can process 19.2 transaction/second, but under DOS/VTAM this drops to 12.6 transaction/second. The villain is the software complexity of VTAM. One Megabyte devoted to VM is not uncommon; however, memory is getting cheaper, so that is less of a problem, provided one has the floorspace.

Training is another problem; not only is it costly, but the trained people are worth more, and are attractive targets for raiding by other employers. The other drawbacks -- the VTAM lock-in, lack of multi-host networking, true DDP and international protocols -- have been partially solved.

Advantages to SNA

Why are users going to SNA? The following chart shows the reasons cited by respondents. The survey results are detailed in a special report offered by IDC's Distributed Processing Reporting Service. The charge is $95.

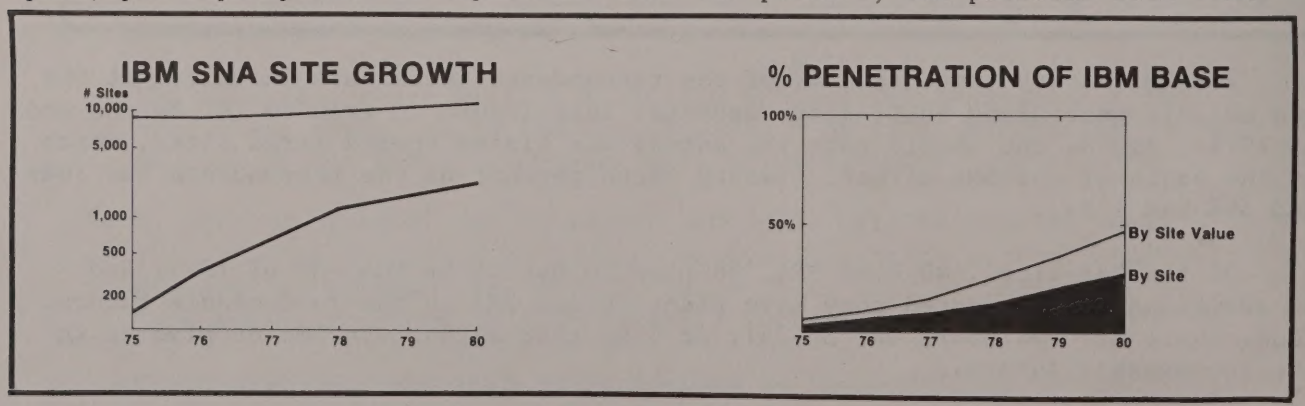
	Mentions	
	#	%
Better network throughput	26	41
Better prices/newer hardware	22	35
New application/easy to go SNA	8	12
New application/SNA worked best	7	12

The reasons for rejection varied, but the most frequently mentioned were:

	#	%
No savings	62	21
Memory overhead	52	18
VTAM	39	14
SNA hardware	27	9

In order, the top three applications of SNA, both now and in the future are: inquiry response, sales order entry, and inventory control.

Of the users who answered the question whether SNA met their expectations, 22 said yes and seven said no. There were conversion problems; software received 18 mentions; hardware, 12; training, 14. Eight said they had no problems. Among the factors responsible for the problems were: the caliber of IBM technical support, principally lack of experience with the product, and problems with VTAM.



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FOREIGN LEGISLATION ON DATA FLOW MAY CAUSE PROBLEMS FOR MULTINATIONALS

A new world information order is fast evolving, largely without the advice and consent or even the awareness of top executives of multinational firms. The Europeans' propensity to regulate the free flow of data merits a strong look by chiefs of multinational firms, and it is up to the DP and communications managers to spur their top managment into awareness and action.

- Six European nations have enacted legislation regulating the flow of information, and more are considering such action.

- The heart of the legislation is protection of individual privacy, although at least one also treats legal entities as well as persons.

- The basic difference between the U.S. and the Europeans seems to rest in the attitude toward enforcement. The U.S. is a proponent of voluntary enforcement of privacy protection while the Europeans are establishing separate bureaucracies to administer the regulations and want an equivalent administration in the U.S.

- EDP/IR has a gnawing feeling that the U.S. government may well be the adversary of a U.S. firm trying to do business with a European firm. Many at a recent conference seemed to be implying a basic distrust of a U.S. firm's ability to prevent the U.S. government from getting certain data that it is holding for the European company. This problem could be mollified by domestic privacy legislation in the private sector.

And part of the new world information order will be the less developed countries (LDC) or third world nations. The governments of these nations may show a vexing propensity to administer the environments of their nations as they see fit and to the possible exclusion of many companies and technologies they feel they can do without. But at the same time, these countries are becoming increasingly aware that they want their slice of the pie, even though they may not be able to eat it yet. For instance, these nations are expected to want considerably more radio frequencies than they now have. The pie is up for recarving at the World Administrative Radio Conference (WARC).

Marketing in these countries will require a different approach. Companies will have to justify their proposed presence not in terms of their profits, but in terms of what their presence will contribute to these nations' development.

Because the laws generally prohibit the transfer of personal information from one country to another, it stands to reason that the companies that will be affected most are those that have a network with a central site and deal in such information as credit, bank accounts, or personnel records. Those companies that never changed from a standalone system in each country are obviously less affected. For instance, Proctor and Gamble has operations in nearly every country it is in and does very little transfer of personnel data. Most of its time-sharing to the U.S. is for scientific calculations, so it should not have much of a problem.

But even when a company knows it has a problem, as is the case with Eaton Corp., the part that it can quantify in dollars is only the tip of the iceberg compared with impaired communications, delays and other factors that affect oper-

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ations, according to Earl Kendle, vice president, information systems at Eaton. Kendle estimates reverting to standalone systems in various countries could cost more than $250,000 annually.

And then there are those who seemingly would be drastically affected, such as American Express Co. But a company spokesman thinks it is unlikely that the European legislation would put its own banks out of business, and so is waiting to see what the banks do to cope. American Express has all its European DP operations in Brighton, England.

Where to go?

As with nearly any complex situation, there are numerous players, some of whom haven't really been talking with each other, such as business and the U.S. government. But one player notably absent is any type of association of multinationals, both U.S. and foreign based, that could present its case to the major governmental bodies, such as the Organization for Economic Cooperation and Development (OECD) and the Council of Europe. Representatives of both the U.S. and foreign governments indicated an eagerness to listen to industry's side of the story. Many of the European government representatives were gathered in New York at the recent conference on "Data Regulation -- European and Third World Realities" sponsored by Online Conferences, Ltd. of Uxbridge, England. Proceedings will be available from the sponsor.

- The U.S. State Department presents the U.S. view to other countries. Morris Crawford, acting director of State's Department of Science and Technology, is in charge of the overall State Department effort on data regulation. Crawford is at Room 3427, State Department, 2201 C St., N.W., Washington, D.C. 20520. The State Department is chair of the interagency task force and also has an industry advisory committeee under the direction of Hugh Donaghue, Control Data, 901 South Highland, Arlington, Va. 22204. Companies indicating to Crawford an interest in the advisory committee will be notified of meetings, which are open to the public.

- The National Telecommunications & Information Administration serves as principal staff to the State Department on the transnational data flow issue as well as policy maker for domestic privacy issues. Bill Fishman of NTIA is vice-chaiman of the task force to OECD. He can be reached at 1800 G. St., N.W., Washington, D.C. 20504.

- The Interagency committee, under the direction of Warren Christopher, also watches such things as the upcoming WARC conference. An unclassified version of its report should be out next year. Other federal members include: Federal Communications Commission; Department of Commerce; Office of Science Advisor; National Science Foundation; Office of Management and Budget; Department of Justice; Department of Defense and the National Security Council.

The powers in Europe

Just as it's a bit tricky to find one's way around the maze in Washington, life is not simple for the U.S. representatives who deal with what is happening in Europe. There are two organizations, each with its own philosophy and proposed set of regulations: the Council of Europe (COE) and the OECD. The OECD has

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created an expert group, the Information Computer and Communications Policy (ICCP) group, which is in charge of drafting guidelines for harmonizing transnational data flow. The guidelines are due to be completed by July.

- The Council of Europe consists of 19 countries; the U.S. and Japan are not members. Basically it plans a treaty that would have the force of law based on a minimum set of assurances concerning protection of individual privacy protection. As envisioned, there would be a data protection authority in each participating country.

- The OECD, which includes U.S. and Japan, is working to draft guidelines that would be voluntary, similar to those it created for the multinational code of conduct, Under this plan, nations would agree to the code, and then individual companies would provide assurances. Not much teeth in this plan.

- The U.S. government has stated it opposes anything but voluntary systems, and is loathe to create a bureaucracy to handle privacy protection. The Europeans, in contrast, are making such a bureaucracy mandatory for nations with which they transmit data.

- The U.S. approach is geared toward data protection in specific sectors rather than an omnibus approach that many European countries have adopted.

With the possibility of a stalemate looming as a result of U.S. administration's unwillingness to create another agency to be responsible for data protection, perhaps it is time for chief executives not only to become informed about the European scene but to focus on the need for domestic legislation in the private sector. Interestingly, a key recommendation of the Privacy Protection Study Commission was the establishment of "an independent entity" to monitor and evaluate personal privacy legislation. The two requests dovetail nicely, but the Carter administration needs some persuasion backed by dollar figures from the business community on the implications of not having such an agency.

Crawford observed the COE resolution has "a far stronger enforcement provision than would be acceptable to the U.S. But if the bridge cannot be closed then we'll have to live with it. "But, he added," that is a very iffy hypothesis." When asked whether State has any disaster plans, he responded that one "should assume thinking is going on even if it is not apparent."

EUROPEAN DATA REGULATIONS

Country	Date Effective	Private Sector	Public Sector	Legal Enitity	Comments
Sweden	1973	yes	yes	yes	DP askes permission; no licensing
Germany	1978	yes	yes	no	
France	1978	yes	yes	no	DP declares files; no licensing.
Austria	1978-81	yes	yes	yes	license DP
Norwary	1978	yes	yes	yes	
Denmark	1978	yes	yes	yes	

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• IBM LOWERS MEMORY UMBRELLA--AGAIN. This time the action includes MOS not only on 370s but also on the 303X line. And, to play ball with that other maker that offers larger memories on its machines, IBM is switching to 4K chips for the 3033, so the maximum memory is now 16M instead of the previous 8M. Amdahl is expected to drop its memory prices to the mid sixties soon. The IBM memory cuts are about 30% on purchase prices and 20% on lease and rental, thus bringing the purchase prices to $75,000/M byte from the previous $110,00/M byte. The memory price cut amounts to anywhere from a 1.2% price cut on a CPU and memory for a 158-3 with 2M to 9.6% on the same CPU with 8M. To upgrade, a 3033 user must replace all his 2K with 4K chips, for a cost of $478,000 when going from 6M to 12M.

• MORE TIME-SHARING FIRMS supply CPUs to customers, but this time around they aren't catering specifically to the IBM look alike mart. Scientific Time Sharing Corp. is using a 370-compatible mini but is emphasizing its APL orientation. The Quad 100 is offered as an extension to Scientific's APL*PLUS service or as a standalone system. The firm offers inhouse users two packages in the form of VSAPL enhancements and a full APL*PLUS system running under MVT or VM/370. And GE, which watched NCSS and ADP enter the hardware game, now has unveiled its Marklink system. Marklink consists of a mini "terminal" made by Texas Instruments to GE specs, the use of GE's host computers, terminals, and the use of GE's communications network. The mini can handle up to 16 terminals and memory ranges from 64K to 352K. There is 3780 emulation as a concession to IBM types. GE indicates it expects average use to cost between $30,000 and $35,000 a month.

• WANG PICKS COPIER TO INTEGRATE DP AND WP. Both Wang computers and Wang Office Information Systems can provide input to an intelligent copier that prints 18 page/min by combining CRT and fiber optic technology. As many as 24 stations can feed input to the Image Printer, which costs $35,000 and will be available in March. The Image Printer fits into Wang's concept of distributed intelligence hierarchies touted in the company's new OIS gear that has up to 32 devices and 170M bytes storage. The Image Printer should be a first step toward endowing copiers with more functions.

• GSA RESHUFFLES DP CLASSIFICATIONS AND PUTS GSA's Automated Data and Telecommunications Service in charge of procurement for ADP and telecommunications equipment and services in attempts to eliminate duplications between items on ADTS' non-mandatory and Federal Supply Service's mandatory schedule contracts. Among items switching into the DP category are stand-alone displays with more than one line of text and shared logic word processing systems; POS gear; and programmable calculators that have internal memory, language and peripherals.

• PRIME ATTRACTS APPLICATIONS SOFTWARE for use on its systems while continuing to focus its resources on hardware and systems software. In at least one instance, Prime has developed a joint marketing agreement with a vendor, Management Decision Systems, Inc., and more are expected. Graphics packages for Primes are available from Calcomp and Imlac; management analysis and modeling system from MDS; and Cullinane has a version of Cars 3 audit and retrieval software. Recently, Prime announced three widely used scientific and engineering packages for mainframes have been converted for use on Primes.

• COMPUTER CRIME IS BIG TIME and gets its own manual devoted to investigating crimes. Contents range from forensics to investigative auditing. The Computer Crime Investigation Manual costs $77 from Assets Protection in Madison, Wisconsin.

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Special loyalty edition

IBM REMAINS FAVORITE IN USER "LOYALTY" RATINGS AS MAINFRAME COMPETITION SWITCHES TO THE PCM COURT

When last EDP/IR scanned the vendor "loyalty" scene, the 370 product cycle had crested, migration had slowed, and users who were replacing mainframes were straying to new vendors more than in years previous. Small systems were seeing most of the action . . . and Amdahl 470s were yet to be in volume shipments.

That was in 1976. Users are still fairly loath to go through the conversion hassle of changing mainframers -- as this, the "Gray Sheet's" 11th study in its 15-year existence, illustrates -- but the PCM CPU impact is beginning to be felt. Further, the action in the small system trenches remains hot as Burroughs 1700s, Sperry 90/30s, and a whole slew of small business systems and minis begin to replace small 360s, System/3s, and other old mainframes.

As for the specifics of user proclivity to migrate, EDP/IR's study charts about 20% of the base (by dollar) migrating one way or another -- to a current vendor or to a new one during 1977. In 1978, the preliminary figures depict a base even more quiescent . . . related perhaps to the shipping cycle of IBM's new 303X computers.

In all, the loyalty patterns tightened -- as Sperry continued gaining ground on a rating that dipped when it ingested the RCA base, and Honeywell reversed a three-year downtrend significantly -- and remained generally high. And, two other important trends continue:

- IBM continues to get more aggressive, as the "dollar loyalty" and "dollar competitiveness" ratings illustrate strikingly. In addition, the mainframe titan retains its "most loyal users" crown.

- A change in CPU vendors as a measurement of loyalty continues to diminish as a benchmark of overall loyalty . . . as peripherals, software, financing arrangements, etc., dilute the importance of the CPU.

As EDP/IR has said through the years: Brand loyalty is not the who le story. But as one of the oldest, continous trackings of the industry, the study does offer a unique historical perspective for examining trends. And user actions.

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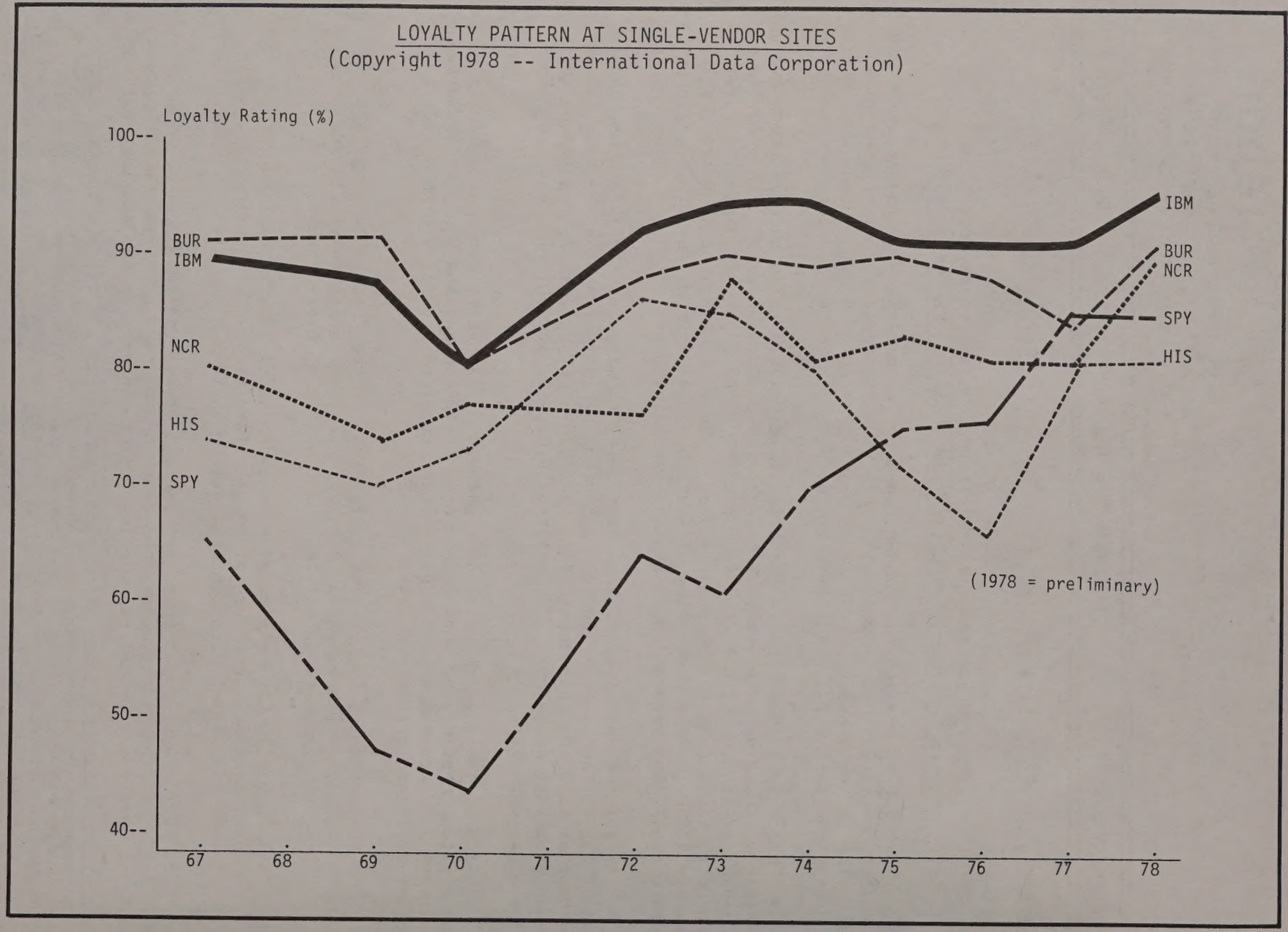

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DOLLAR LOYALTY AT COMBINED (SINGLE- AND MIXED-VENDOR) SITES
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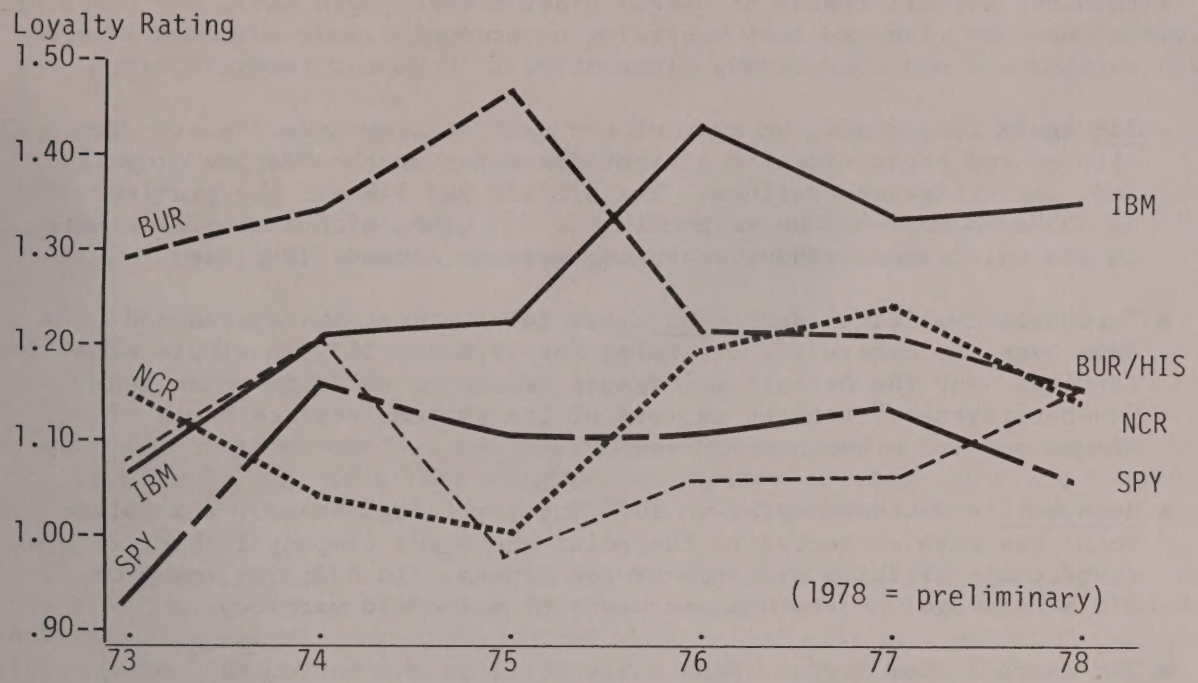

DOLLAR COMPETITIVENESS AT COMBINED SITES -- COMPARISON WITH IBM
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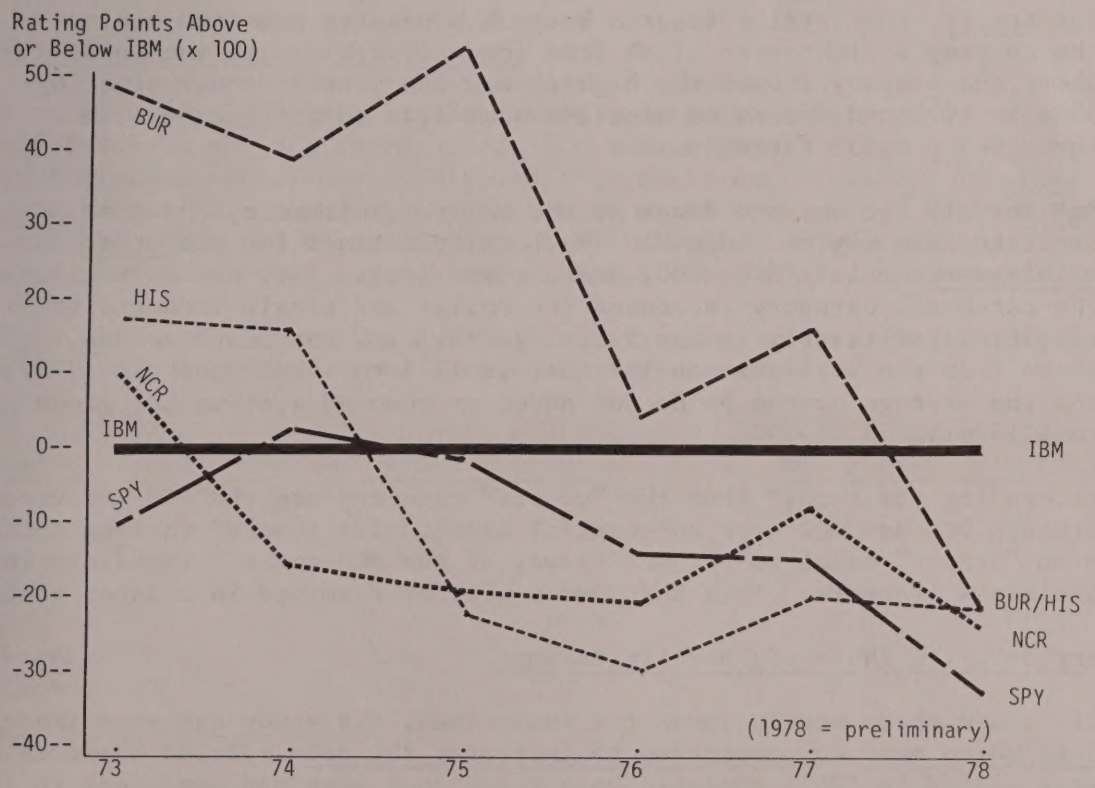

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The vendor scorecard

Within the overall trends of user migration (see pages 8&9), the fates of individual vendors rise and fall according to product lines, customer service, growth paths . . . and competitive alternatives. From the latest study:

- IBM again fended off the rest of the pack in single-vendor site loyalty -- and began widening a significant gap in the "dollar" loyalty and competitiveness ratings. The 370/138 and 148 and the promise of 303Xs to come may be responsible . . . along with a user propensity to add mainframes without scrapping systems already in place.

- Perennial challenger Burroughs seems to have lost its fine-honed edge over the others . . . dipping for 1976 and 1977 in single site loyalty. But the Detroit mainframer remains a solid first in the "competitiveness" ratings as more of its systems replace those of almost any two other non-IBM vendors.

- Honeywell's downward spike in 1976 loyalty (single-vendor and dollar both) has been corrected to the point where the company is back within respectable striking distance of the others. In addition, many of HIS's "disloyal" customers are users of quite old machines.

- The entrant from Dayton, NCR, while still in the bottom half of the single-vendor site loyalty pile, has made impressive gains in the dollar figures . . . surpassing all but IBM in 1977 loyalty. In other words, those users loyal to NCR are upgrading substantially, and NCR's toehold in mixed-vendor sites has increased.

- For Sperry, the loyalty figures bespeak a massive momentum behind the company's eight-year climb from the cellar . . . to the point where the company showed the highest non-IBM single-vendor site loyalty in 1977 and increased single-vendor site competitiveness in three years by 35 rating points.

- But for all the ups and downs of the major mainframers, the most exciting tale may be hidden in the loyalty ratings for the other mainframers: mainly DEC, CDC, Amdahl, and Itel. For, not only has the catch-all category increased its dollar and single-vendor site loyalty significantly in the last 5 years . . . but its base has grown from the smallest non-IBM base in 1975 to the biggest in 1978. And the average system value for added or removed systems has grown to $1.5 million in 1978.

Spearheading the thrust from the "others" category are the PCM CPU vendors . . . although DEC and CDC have substantial bases. But most of the new conversions to an "others" mainframer comes by way of the PCM route. Certainly in the upper size class brackets. This phenomemon will be examined in a later section.

Caveat emptor . . . the study has limitations

While the numbers mostly speak for themselves, the study has some inherent limitations which must be understood to interpret the data. It is based on computer sites listed in IDC's Domestic Data Files that received computers in 1977 and 1978 (or said they would receive a computer in 1978). Keep in mind:

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- Only U.S. sites receiving general-purpose (Group A) computers from U.S. makers have been considered.

- Acquisition method is not considered -- a very important limitation in considering the effect of a user's "disloyalty" to a vendor.

- Only sites replacing or adding to existing computers are considered. Entry-level sites have not been scanned.

- In single-vendor loyalty, it's one site, one vote -- regardless of CPU size. Small system users affect some vendors more than others.

- For dollar rankings, the value of all of a vendor's computers at a site (either single-vendor or mixed-vendor) is considered, not just the value of the CPU installed.

- Figures may be based on the number of sites or the value of systems installed . . . at either single-vendor sites or at single- and mixed-vendors sites combined. Exercise care in comparing charts, tables, etc.

The sample studied for 1977 was considerable (almost 3,800 sites); because of the time lag in data collection, the 1978 sample was smaller (1,100). Thus, 1978 figures should be considered preliminary -- and will be updated in the next loyalty study. In past years, the forecasts have tracked fairly close to the next study's observed results, with no particular pattern to the differences.

EDP/IR does feel that this study's results for 1978 are biased in the following manner: The base will probably churn more than the 10% indicated, and the dollar figure drops of the non-IBMers compared to IBM may flatten out.

Single-vendor sites versus mixed sites

Traditionally, EDP/IR's loyalty study focused on single-vendor sites. Back in 1967, that's about all there were. But because small systems coexist with big ones at the mixed sites, any loyalty ratings based on the number of sites defy easy interpretation. To bring order to this mixed site chaos, in 1974 EDP/IR computerized the study and began extracting dollar values for migration . . . giving a clearer picture of what happens when a mixed site adds or removes a computer.

The chart below shows the ratio of single sites and single site equipment values to mixed sites and mixed site equipment values:

Vendor	1977 Single ÷ Mixed No. Sites	1977 Single ÷ Mixed $ Value	1978 Single ÷ Mixed No. Sites	1978 Single ÷ Mixed $ Value
Burroughs	3.1	2.8	2.6	0.5
Honeywell	6.6	3.5	2.5	2.8
IBM	9.6	5.2	6.8	2.8
NCR	12.4	14.0	7.0	18.3
Sperry	5.1	1.7	3.4	1.6
Others	0.7	0.7	0.6	0.8
TOTAL	5.7	3.7	4.7	2.0

(Note: This is EDP/IR loyalty study sample data only)

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Another way to look at single site importance is in the changes of dollar values at single- and mixed-vendor sites. In the EDP/IR loyalty study, the single-vendor sites grew at a faster rate than mixed-vendor sites.

Vendor	1977 Single - Mixed $ Change During Year	1978 Single - Mixed $ Change During Year
Burroughs	3.8	1.4
Honeywell	(-3.9)	9.9
IBM	7.1	6.2
NCR	(-12.0)	(-6.0)
Sperry	7.0	3.1
Others	0.8	0.4
TOTAL	5.5	3.7

(Note: A negative number means a vendor's dollar value of equipment at mixed sites actually dropped)

Overall, single-vendor sites in the sample added $1.4 billion to their on-hand inventories, mixed-vendor sites added $225 million. Some other notes on the ratios presented:

- "Others" computers appear to be generally add-ons, often at sites with many mainframes.

- Despite the 1977/78 single-vendor dollar growth over mixed sites in the sample, the long-term trend is for more mixed sites. In 1975, for instance, single-vendor sites increased in value "seven times more than mixed sites" (EDP/IR,Jan.21,1977).

The importance of the dollar

While the temptation is strong to look only at single-vendor site loyalty -- it's the simplest chart and simplest table -- a more meaningful story may be told in the "dollar" figures. After all, if an IBM 370/138 replaces a more expensive 155, is a user really loyal? By site count, he would be. But by the "dollar loyalty" he wouldn't be.

The formulas for dollar loyalty and competitiveness are shown on page 10 along with the table. Keep in mind that dollar values for a vendor at a site will include whatever computers are on hand with his nameplate on them -- not just the CPU that was put in during the year. The value of a vendor's equipment at a site will be different at the end of a year from the beginning of the year.

In a nutshell:

- Dollar loyalty -- compares the value of loyal sites at the end of the year to the starting customer base of a vendor. It doesn't track sites new to the vendor.

  Thus, a dollar loyalty rating of 1.30 means a vendor's starting customer base upgraded during the year until it was 1.3 times as big as it was (or 30% bigger) in the beginning.

. . . *CONTINUED ON PAGE 11*

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SINGLE-VENDOR SITE LOYALTY
(Copyright 1978 by IDC)

	(1)=1977 SITES GAINED	(2)=1977 SITES LOST	(3)=1977 SITES LOYAL	% LOYAL* 75	76	77	*78*	% COMPETITIVE+ 75	76	77	*78*
BUR	82	19	99	90	88	84	*91*	42	60	53	*24*
HIS	40	37	166	72	66	82	*82*	-10	-9	-1	*-14*
NCR	9	42	190	83	81	82	*90*	-9	-10	-14	*-7*
SPERRY	51	22	122	75	76	85	*85*	-3	15	20	*9*
OTHER	88	5	30	68	77	85	*91*	SS	SS	SS	*SS*
SUBTOTAL	270	125	607	80	85	83	*88*	8	11	20	*9*
IBM	56	201	2085	91	91	91	*96*	-3	-5	-6	*-3*
TOTAL	326	326	2692	88	89	89	*94*	-	-	-	-

$$* \%\ \text{LOYAL} = \frac{(3)}{(2) + (3)}$$

$$+ \%\ \text{COMPETITIVE} = \frac{(1) - (2)}{(2) + (3)}$$

NOTE: 1977 figures reflect movement shown and are based on a sample of 3018 sites (vs. 3435 for 1976). The numbers for 1978 are based on a sample of 829 sites (vs. 621 for 1976 forecast) and are considered preliminary.

INSTALLED BASE OF SITES IN "LOYAL" SAMPLE (3) AT YE 1977

BUR	HIS	NCR	SPY	OTH	IBM
$197M	$203M	$ 96M	$203M	$152M	$3,729M

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IBM USERS TAKE WING

In a study separate from EDP/IR's Loyalty Study, publisher International Data Corporation perennially examines the migration habits of IBM users. In the latest edition (November 1978), the 360/370 Migration Study charts a user population growing to the tune of 17% (by dollar) a year . . . on yearly processor shipments of about 2,000 a year in the U.S.

After a period of quietude in 1976 -- those 360 users interested in migrating had already done so -- activity swelled in 1977 with the shipment of 2,400 new processors . . . the 138/148 had entered the picture. Three-quarters of all 370 migrations in 1977 were to the new IBM systems: dramatically increased price/performance was a powerful lure. Many systems were add-ons, not merely CPU replacements.

Sampling almost 1,000 users with 1,100 IBM 360/370 and PCM CPUs installed, the report reveals that:

- While the pressure on the 360 base continues, "the larger the system the more the demand relative to supply. Thus, demand for the 360/65 is strong as quite a few smaller 360 users are still upgrading to it, offsetting the 360/65 users going to the 303X and PCM alternatives."

- Of 370/115 and 125 users, most migration is coming from rental customers . . . 80% of which are going to the 138/148. Of the 135/145 users, even lease and purchase customers are going to the 138/148.

- Surprisingly, 138 users are already upgrading . . . to 148s and the 3031 in some cases; the 148 base shows 40% of the rental customers migrating to primarily 158s or 3031s.

- Demand for the 303X family is coming from across the 370 large user board. There continues to be a significant amount of upgrading by 158 users to the AP version of the 158 (perhaps an interim move to a 303X on long delivery schedule).

- PCM vendors show no appreciable migration for 1978: most customers have been users for less than a year, and most are locked into lease and purchase plans.

These findings regard CPU-swapping type migration; there is also significant add-on movement. The 138/148s make good add-ons for large users, and 158 users topping out on the air-cooled systems and not wanting to switch to water-cooled 168s are also adding 148s and 158s. And for 168 users without early deliveries of their 3033s, adding (or going PCM) may be the best option.

The IDC study predicts that the specific 1978 supply and demand scenarios will have been penned by the users thusly: 115 and 125 populations will drop, 135 and 145 populations will drop for the second year in a row, 155/165 populations will drop (despite off setting demand by medium-scale 360/370 users), but 158/168 populations will remain flat. This latter phenomenon will result from "cascading," where a large company moves a replaced 158/168 to a smaller branch office, which moves its computer to another branch, etc. . . . and to the fact that there is still a significant amount of demand for computing power that IBM factories cannot supply.

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IBM SYSTEM POPULATIONS -- 1973 TO 1980
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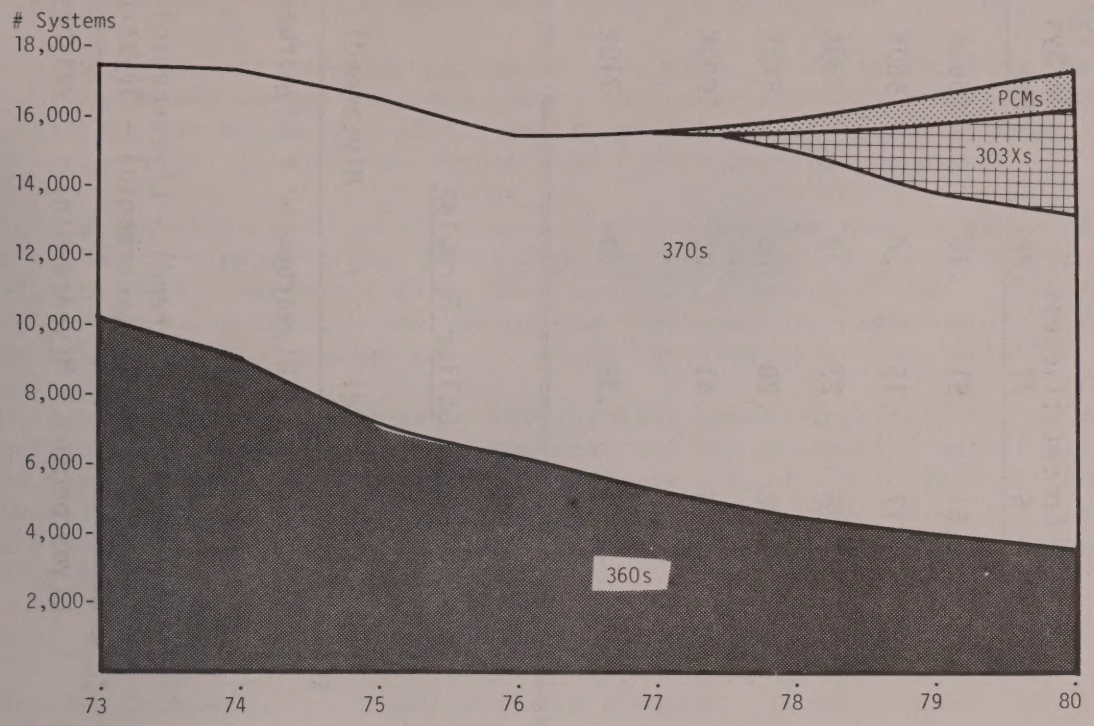

The power of the plug-compatible

Against the overall backdrop of 17,000 IBM systems in the U.S., the PCM CPU gains may not seem that heady . . . but the IDC study predicts that by 1980 fully 20% of the 148s and up will be PCM machines. There'll be over 1,200 PCM systems installed by then, based on an extrapolation of survey results rather than assessments of specific vendor shipment rates. Though the prospects for PCM vendors is not unlimited -- the rate at which new companies are getting into the act would seem to belie this truism -- depending on IBM's strategy of containment, short-term prognostications are healthy.

(In 1977, Amdahl and Itel shipped more systems of 158 size or bigger than all the other non-IBM mainframers combined . . . totaling 20% of the unit shipments of computers that size.)

Rent/Lease/Purchase distributions

By the end of next year, the rental base of 360s is expected to vanish, the 370 rental base to drop in half to a little over 1,000 systems. For 370s, the 4-year TLP base will fare a little better: to just over 1,000 systems, or 60% of its 12/77 level. Meanwhile, the 3rd-party lease/purchase base will grow by 500-600 systems as purchase-option accumulations woo users.

For 138/148s, about 25% are purchased, a similar percentage under 3rd-party lease. The rest are rentals and 4-year TLPs. On larger systems purchase remains the predominant access method (over 40%). Within the 303X family, 35% of the 3031s and 3032s are being purchased, 55% of the 3033s. The rental/TLP ratios are 25% for the 3031 and 3032, 10% for the 3033.

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COMBINED SITE PROFILE: DOLLAR LOYALTY AND COMPETITIVENESS
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	1977 D+L+N	Dollar Loyalty 75	76	77	*78*	Dollar Competitiveness 75	76	77	*78*	1977 Av Sys Value Rem	Add
BUR	$252M	1.46	1.21	1.21	*1.15*	.79	.51	.51	*.16*	$660K	$860K
HIS	$331M	.98	1.06	1.06	*1.15*	.03	.17	.15	*.16*	580K	800K
NCR	$ 89M	1.00	1.19	1.24	*1.14*	.05	.26	.27	*.14*	230K	340K
SPERRY	$332M	1.10	1.10	1.13	*1.05*	.24	.32	.20	*.05*	540K	790K
OTHER	$379M	1.16	1.15	1.11	*1.20*	.58	.36	.41	*.20*	1000K	650K
IBM	$3,575M	1.22	1.43	1.33	*1.35*	.25	.47	.35	*.38*	710K	1180K

Site Code

L = LOYAL: adding or upgrading a vendor's system

N = NONLOYAL: adding or upgrading systems of another vendor at a mixed site

D = DISLOYAL: removing all of a vendor's systems, replacing with those of another vendor. If not all are removed, site is NONLOYAL

C = CRACK: new site for that vendor

Note: Dollar values for a vendor at a site include all of that vendor's equipment on hand.

Dollar Formulas

$$\$L = \frac{L(\text{yearend}) + N(\text{yearend})}{L(\text{yearbegin}) + N(\text{yearbegin}) + D(\text{yearbegin})}$$

$$\$C = \frac{C(\text{yearend}) + L(\text{yearend}) - L(\text{yearbegin}) + N(\text{yearend}) - N(\text{yearbegin}) - D(\text{yearbegin})}{L(\text{yearbegin}) + N(\text{yearbegin}) + D(\text{yearbegin})}$$

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- Dollar competitiveness -- compares the total change in the value of a vendor's gear at all sites to the starting customer base ... thus, includes "crack" sites where a vendor was not present at year-beginning.

  A dollar competitiveness rating of .40, then, since it includes the sites gained during the year, means that a vendor's year-end customer base is 40% bigger in value than the year-beginning customer base. A not-so-loyal base can be compensated for by gaining new sites.

(For mixed sites where a rival vendor's computer was the one replaced -- the so-called "nonloyal" sites -- and some but not all of a vendor's systems are removed, the dollar ratings reflect the change in a vendor's base. This is covered by the formulas through the use of year-end and year-begin values. Thus, it's to a supplier's advantage to be the one upgraded at a mixed site.)

Readers are urged to remember, though, that the ratings reflect the if-sold value of a vendor's equipment . . . depreciation and aquisition method are not accounted for. A user's loyalty must therefore be considered to include the attractiveness of more than just the hardware or service involved. And loyalties -- since acquisition method is not measured -- don't have a direct bearing on a vendor's profitability.

A peek at the "crack" sites . . .

Besides looking at the aggregate site movement for each vendor, EDP/IR made a site-by-site comparison of the 1978 single- and multi-vendor "crack" sites. A total of 129 sites was tallied. Since these "crack" sites include systems that were either installed in 1978 or planned for installation . . . many of the multi-vendor sites will revert to single-vendor sites once the equipment shakedown period is over. While the CPU changes are charted in the following pages, note:

- About 1 in 5 computers is of vintage older than 1974 . . . which could easily represent trades made on the used computer market.

- A little more than 1 in 5 computers at "crack" single-vendor sites is bigger than a 370/115 (Size Class 3); at the mixed sites about 1 in 2 is a big system (over half of those are IBM or PCM machines).

There is also a class of systems that have been replaced by small business systems or minis. At the single-vendor sites these are considered as "cracks" since they can be said to have replaced a mainfrme . . . at mixed sites they are considered only possible "cracks," since they cannot yet be said to have replaced a mainframe.

. . . and inside the PCM intrusion

EDP/IR also scanned the "crack" site data for 1977, but considered it too outdated and unwieldy to present in these pages (283 mixed sites, 326 single). Instead, the PCM "cracks" -- and most PCM installations will be considered "crack" installations -- were culled from the listing. These are presented on page 13. Note:

- Almost as many single-vendor site "cracks" went to PCM vendors as to non-PCM vendors in the 138 Size Classes and up. The ratio favors the PCMers as the size class increases.

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- Many of the mixed site "cracks" are probably add-ons in the place of loyal IBM upgrades or conversion to multiprocessing. Some will revert to single sites after system shakedown.

As we see it

Vendor loyalty as measured by the EDP/IR studies is but a limited analysis of user fealty. But it's generated from hard data and has a historical background almost as old as EDP/IR itself. And thus, once the study's limitations are taken into account, it provides meaningful insight into the migration instincts of computer users.

For 1977 and 1978 it seems that users have showed a little more inclination to exchange mainframes (base churn was less in 1975 and 1976) . . . but with pretty much the same aversion to swapping vendors in the process. More equipment is still lodged at single-vendor sites than mixed sites, but the experience of having more than one mainframer to deal with is growing more common. So, too, is the use of small business computers or minicomputers as mainframe adjuncts.

And, as the charts depict, the differences between the non-IBMers are narrowing . . . at the same time the Giant is scoring impressive competitive rating gains over the rest of the pack.

1978 "CRACK" SITES AT SINGLE-VENDOR INSTALLATIONS

IBM

138	/NCR 200
S 3-15	/H-2020
115	/NCR 100
S 3	/SPY 9200
360-40	/H-115
135	/H-2040
S 3-12	/SPY 9200
138	/RCA(SPY) 70/45
S-34	/B 700
S 3	/NCR ?

HIS

Lev 62	/Sys 3-10
Lev 62	/Sys 3-10 Sys 3-8

SBCs & Minis

Wang 2200	/NCR 500
HP-1000	/H-200
Lockheed 11	/B 1700
Basic 4-700	/Sys 3
Datap't 6600	/Sys 3

Burroughs

2802	/SPY 9200
1800(2)	/H-2040
1700	/IBM 1401
1726	/360-20
1860	/Sys 3-10
2800	/360-30
1860	/NCR 101
1700	/360-20
1700	/Sys 3-10
1860	/Sys 3
1700	/Sys 3-10
1712	/IBM-1130
800	/H-2020
1860	/SPY 9300
1860	/360-20

DEC

System-20	/360-30
System 20	/H-115
Qantel	/B 700
Qantel	/Sys 3-10
Microdata	/B 3500
Royale	
Basic 4-600	/S 3-10

Sperry

90/30	/Sys 3-10
90/30	/Sys 3-10 Sys 3-12
90/30	/Sys 3
90/30	/Sys 3
90/60	/NCR 101
BC7	/H-105
90/30	/Sys 3
90/30	/Sys 3

NCR

8250	/minis
8450	/Sys 3

PCM

AS/4	/135
CDC 480-1	/135
AS/5	/360-65 360-30

X /Y = X Replaces Y

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1977 "CRACK" SITES BY VENDOR AT COMBINED (SINGLE- AND MIXED-VENDOR) SITES

IBM

125-2	+	H-64/20
S 32	+	SY 1004
138	/	GE210+B4700(2)
148	+	NCR 201,251
125	+	H-1015
155	+	H-635
145	+	H-2200
148	+	H-6060
138	+	B 3500
360-50	+	SY 9480
370UNK	+	H-64/40
138&148	/	NCR 200,101
	+	251
125	+	GE 615
S 3	+	B 3800
S 3-15	+	SY 9200
S 34	+	NCR 50
S 32	/	NCR100+SY90/30
S 3-15	/	H-2015+H-2015
148	+	NCR 151
S 3-12	+	SY 9200
S 3-15	+	NCR 101
138	+	B 2700
115	/	NCR 200+201
138	/	RCA7045+SY9300
S 32	+	B 1712
S 3-15	+	H-125
S 34	+	NCR 50
S 34	+	NCR 50
S 32	+	NCR 395
S 3-12	+	NCR 399
S 34	+	9300
360-30	+	H-58

BURROUGHS

6811	+	7070,1401(2)
6807	+	H-2040
6748	/	360-40+360-40
800	+	IBM 1401
1717	+	360-20
1860	+	H-2020
1870	+	IBM 1130
1726	+	H-115
730	+	NCR 500
1710	+	S 3-10
1830	+	H-115
1860	+	H-2020
800	+	S 3-6
1724	+	H-58
1700	+	Sys 3
4800	+	SY 491

NCR

8250	+	S 3-10
8350	+	S 3-10

SPY

90/30	+	H-2040
1106	+	IBM 1440
9200	+	S 3-10
90/30	+	Fri-10
90/30	+	Fri-10
90/30	+	360-20
90/30	+	Sys 3

CDC: 172 + 145,B1700

HIS

62	+	S 3
66,L6	+	135
66/05	/	NCR200 + 201
66/05	+	B3800,HP3000
62	+	S 3-10
62	/	S 3, S 32(2)
	+	S 32
66/20	+	360/50 (2)
62	+	SY 9300
62	+	S 3-10
62	+	NCR 100

DEC

2050	+	370/158
S-354	/	B500 + 1700
S-10	+	360-20
2040	+	H-2200
2040	+	NCR 200

PCM

AS/6	+	158
AS/5	+	148,360-65,50
AS/4	/	145+145
AS/5	+	RCA 70/6
AS/5	+	155 (2)
470/V5	+	360/65

X /Y + Z means:
X replaces Y and
joins Z .....

1977 PCM "CRACK" SITES IN IBM'S BASE

Multivendor Sites

470/V6	/	165 + 165
470/V6	/	165 + 1401
AS/5	+	360-65+minis
470/V6	/	155 + 168(3)
	+	158(3)+B6700
470/V6	+	158 + 165
470/V6	+	168 (3)
AS/5	/	145 + 158
CDC480-1	/	360-40 + 155
470/V6	+	135*,158,168*,30
470/V6	+	145 + 158
AS/4	/	135+145
AS/5	+	158

*(2 ea)

AS/5	+	145
470/V6	+	360/65

Single-vendor Sites

470/V5	/	158
470/V6	/	158,145
AS/4	/	360-50
CDC480-1	/	360-50
AS/4(2)	/	145
AS/5	/	155
470/V6	/	360-50(2),65
AS/4(2)	/	145(2)
CDC480-1	/	360-40
AS/4	/	145

470/V6	/	360/65,158
470/V6	/	145 (2)
AS/4	/	145
AS/5(2)	/	158
AS/5	/	135,360/30
470/V5	/	158
CDC480-1	/	135
AS/5	/	155,165
AS/5	/	155

X /Y + Z means:
X replaces Y and
joins Z .....

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DOLLAR LOYALTY* (x 100) BY INDUSTRY AT COMBINED SITES
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	SIC	% of Sample IBM	% of Sample Rest	IBM 1976	IBM 1977	IBM 1978	NON-IBM 1976	NON-IBM 1977	NON-IBM 1978
Agri.,Mining,&Constr.	01-17	1.0%	.4%	148	167	160	103	105	155
Chem. & Petro. Prod.	20-31	7.3%	1.6%	132	145	162	133	119	108
Durable Prod. Mfg.	19,32-39	9.6%	3.1%	155	138	121	111	129	105
Trans. & Utilities	40-49	8.5%	1.6%	142	126	143	116	120	131
Wholesale/Retail	50-59	6.0%	1.5%	152	141	154	121	133	126
Financial & Insur.	60-69	15.8%	3.9%	142	135	140	113	114	107
Nonprof. Services	70-79	.3%	.2%	131	122	100	116	94	SS
Health-Hospitals	80	1.0%	.6%	146	155	168	98	167	SS
Colleges & Univ.	82	4.0%	2.7%	146	107	137	104	108	121
Computer Services	89,73	12.0%	6.2%	135	125	120	118	110	131
Federal Gov.	91	1.4%	3.8%	137	107	SS	109	88	SS
State Gov.	92	1.7%	.4%	153	109	SS	106	140	SS
Local Gov.	93	1.6%	1.0%	181	160	115	138	122	154
Other	--	.5%	.1%	141	119	127	117	86	SS
TOTAL		70.7%	27.1% (2.2% SIC unknown)						

* Formulas on Page 10
SS = Small Sample

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• MCI ET AL WIN ONE FROM MA BELL, and lessen fees proposed by AT&T. In the latest round, MCI won when the Supreme Court let stand a lower court ruling which ordered phone companies to provide local connections to specialized carriers wanting to offer long distance service. That lower court ruling has been in effect since last May when the high court refused to grant the phone companies a stay. MCI has been to court with AT&T not a few times -- six at least -- in efforts to establish its right to compete in the long distance sector. But the courts are not the only third party involved. The Federal Communications Commission is conducting an inquiry to determine if competition in long distance service is in the public interest. That inquiry could take years. The Justice Department's Antitrust Division sided with the carriers against the phone companies and the FCC, saying the appeals court rulings do not preclude the FCC from considering "whether the public interest will be served or disserved by MCI's continued provision of the Execunet service." . . . The question of price then arises. AT&T agreed with MCI and others that the rates it will charge for connections to local phone company facilities will be based on the carriers' revenues. Under the agreement MCI will pay "more than we're paying today but appreciable less than" what would have been the case with AT&T's tariff it proposed in May. For instance, when revenues from Execunet-type services are less than $110 million annually, competitiors will pay 35% of what AT&T pays for local facilities; this percentage climbs to 55% on revenues of more than $251 million.

• DESPITE PROTESTS, BIG COMPANIES MAY HAVE TO PRODUCE line of business information to the Federal Trade Commission. The Supreme Court let stand a lower court decision despite challenges by more than 200 companies, among them IBM. But collection of data is stayed pending appeal. The FTC wants two types of data: financial performance data by 260 industry categories and estimates from large manufacturers on the value of shipments from U.S. plants. Companies are complaining they will have to reformat their data to the FTC's line of business categories. They also say the FTC is defying the confidentiality of Census data in its request for essentially the same data in corporate patterns reports.

• CRT PRICES ARE DROPPING...Hazeltine's 1400, with 21 integrated circuits and four major LSI components, has a price tag of under $550 in quantities over 1,000. An equivalent terminal in the marketplace last year cost about $900, a Hazeltine spokesman said. Not to be outdone, Perkin-Elmer's Bantam CRT is priced at $599 in lots of 100. Speaking of terminals, Inforex has decided to vertically integrate that part of its operation and acquired manufacturing rights to the B-800 and B-103 terminals designed by Beehive International to Inforex specs for use in the System 7000.

• NCR LANDS SOME BIG POS ORDERS. K mart Corp. has ordered additional NCR gear valued at more than $10 million, including Model 255 checkout terminals and 726 in-store computers. And Publix Super Markets plans to convert about 30 stores in the Jacksonville, Fla., division to 255 scanning systems.

• HONEYWELL FINDS SIZEABLE SYSTEMS HOUSES FOR 6s. General Computer Corp. of Macedonia, Ohio, has ordered about 1,000 Level 6 Model 23 minis -- about $20 million plus -- for packaging as a pharmacy system. Brunswick Corp. placed an order of similar size for systems that will reside in bowling alleys.

• IBM UPS AD BUDGET to $12 million vs. about $8 million last year. Expect to see IBM spots on TV sports as well as sponsorship of Nutcracker ballet on TV.

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• BRITISH POST OFFICE EXPANDS DOMAIN to information retrieval offerings via Viewdata or Prestel service. Currently operational on a 400 terminal test basis, the service is scheduled to be generally available by the end of the first quarter 1979. The offering includes such items as price lists for shoppers and children's stories. DP per se is not available although it is technically feasible. The U.S. should see Viewdata by the end of 1979; it is slated to be offered by Insac, a software house. The first place it will probably materialize will be in the business environment because Insac has not begun filings with the FCC.

• U.S. POSTAL SERVICE LOOKS INTO ELECTRONIC MAIL. The agency is planning to establish a demonstration version of an electronic system which could be expanded to as many as 10 cities within three years. It's not at all clear that the USPS will retain its monopoly position in this new aspect of mail delivery; private competition, which already exists, could be the right Rx for the USPS.

• NATIONAL SEMICONDUCTOR EXPANDS LARGE computer systems operations in San Diego. A decade-long expansion program includes buying 153 acres, building an 80,000 sq. ft. facility beginning in February, and a 200,000 facility in the early 1980s. The total expansion is valued at $17 million plus. The large systems facility has grown from 29 people in 1975 to over 800 people and has shipped over 200 systems. National Semi claims it is second only to IBM in shipment of large gear compatible with IBM's 370/158. The National gear made in San Diego is marketed by Itel Corp. and is a operation distinct from the System 100, a plug-compatible machine that National is selling on an OEM basis.

• HONEYWELL REACHES A MILESTONE in large system installations. The recent installation of a 66/20 to Roper Corp. marked Honeywell's 1000th large-scale computer site. Honewell makes its large-scale gear in Phoenix and Scotland. The sites include Series 60 Level 66s and Series 6000, along with a handful of earlier G-600s. There were less than 100 large-scale sites when Honeywell took over the GE computer section in the merger of October 1970, the firm said.

• DIGITAL EQUIPMENT'S VAX 11/780 TO GROW to over 100 installations with an order from System Development Corp. for 10 of the medium-scale systems.

• HONEYWELL GRABS ONE FROM UNIVAC. Thomas R. Rykken, formerly in charge of the Univac effort to create a bridge processor between the 1100 and 90 series, has been named HIS' director of advanced architecture technology. Rykken is responsible for coordinating architecture and software programs in HIS with those of the Corporate Technology Center and CII-Honeywell Bull in France. The Univac bridge project was cancelled when management decided the cost conversion to a new operating system would be too great.

• DISTRIBUTORS ARE KEY TARGET MARKETS for Keydata Corp., which added 12 distributor categories to its list of prospects for its Unity Series of packaged systems, and for Mini-Computer Systems, Inc., which unveiled an on-line wholesale distributor system. The MCS distributor packages consist of order processing, inventory control, cash management and sales reporting, all of which interface to the company's general ledger type software, and run on the company's Micos 100, 200 and new 300 systems. The 300 supports 300M byte drives and up to 24 CRTs. Keydata estimates it has expanded potential Unity customers by more than 300% with the addition of the 12 other types of distributors, such as auto parts, construction gear; farm equipment; hardware, and electronic parts.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" NOVEMBER 17 • VOL.14,NO.10 P.J.McGOVERN,PUBLISHER

DISTRIBUTED DATA PROCESSING IS HERE NOW IN MANY SHAPES AND SIZES

"If it works, do it" seems to be the axiom of the day about distributed data processing (DDP), which is based on the concept of putting some power where the user is. Attempting to arrive at a more concise definition is like trying to capture elusive, prolific grasshoppers. Instead, users are expeditiously getting down to the business of implementing distributed systems that hopefully appease the user and don't upset the central site operation.

An important point to note is that central site control has not disappeared; rather, DP departments have embraced DDP and have become the "purveyors of DDP rather than victims." And the motivations for implementing DDP are changing, according to an IDC survey of 100 Fortune 500 companies. Existing applications are being redesigned for DDP; previously, the motivation was principally applications-driven and thus DDP handled new applications. Motivations can be almost as varied as the types of systems that are evolving. Regardless of the motivation, for smooth operation the distributed system's structure should reflect the corporation's structure/philosophy.

The recent IDC conference on distributed processing revealed two key points:

- DDP is becoming easier to implement because of the growing number of independent products that emulate protocols of IBM and others. Also, IBM is more lenient in accepting older type terminals within SNA nets. With the 8100, IBM endorsed the peer-to-peer type net.

- The management of data bases seems to be one of the key techincal dilemmas facing DP management. EDP/IR expects more products addressing this problem via data dictionaries, back end data base processors and/or network managers.

There are indeed a multiplicity of types of distributed processing, ranging in complexity from distributed data entry -- which isn't quite in the mainstream -- to job swapping for load balancing. Factors observed by IDC include:

- Decentralization of hardware and control, but not 100%.

- Use of small systems and intelligent terminals tied to a network as adjuncts to a large central site.

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- Nodes sharing a common set of applications, although some may have unique applications as well.

- Local processing of reports.

Perhaps one of the reasons for DDP's growing popularity is that the nameplate encompasses a variety of configurations and users feel they can tailor a system to their particular company's needs. Some of the issues germane to DDP:

- Degree of central control

- Extent of distribution

  + Source data entry and report generation

  + Inquiry to replicated data base

  + Inquiry to partitioned data base

  + Updating of data base

  + Standalone processing

- Degree of job swapping

IBM DDP PRODUCTS

	3790	SERIES/1	SYSTEM/34	8130	8140
Model	2B	5	E23	A23	A53
Price	$40,700	$34,920	$47,220	$29,940	$46,980
Main Memory	64KB	128KB	128KB	512KB	512KB
Disk	30MB	28MB	27MB	64MB	64MB
Diskette	No	Yes	Yes	Yes	Yes
Maximum Memory	196KB	256KB	128KB	512KB	512KB
Maximum Disk	30MB	258MB	27MB	192MB	320MB
3270 Use	1920 Char.	No	No	Yes	Yes
Other CRT	No	1920 Char.	1920 Char.	←2550/3440 Char.→	
Programming	Assembler For Host	Assembler Fortran COBOL	RPG II	Assembler Fortran COBOL DMS	

IBM recently has "embraced DDP with a vengeance." Other DDP-oriented products are the supermarket and bank systems of the 3600, 3650 and 3660 ilk.

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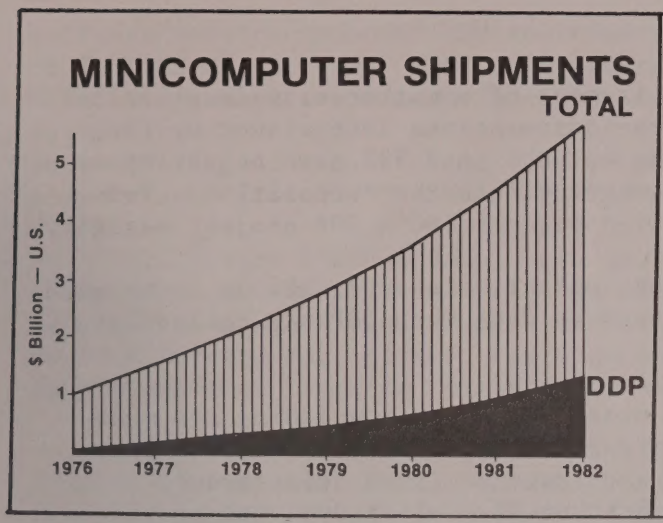
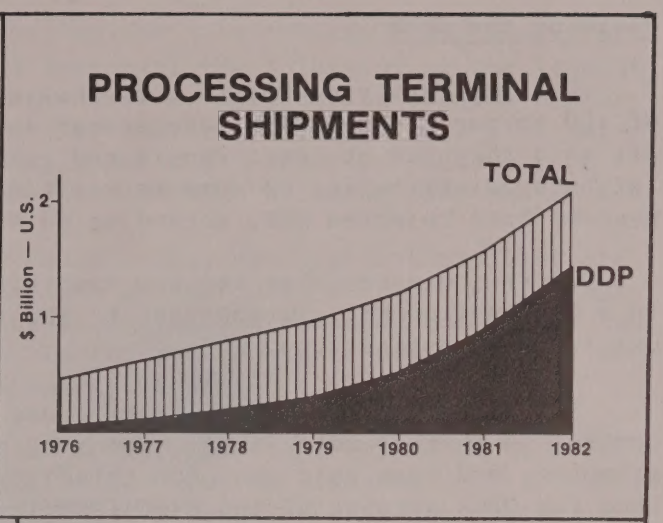
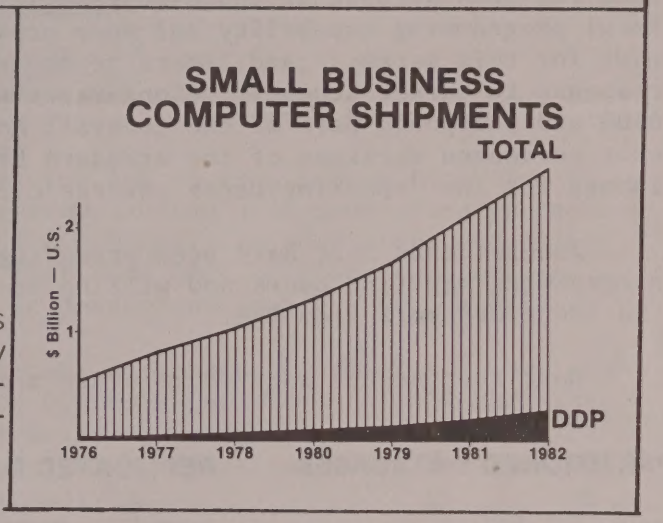




$3 BILLION MART IN '82

U.S. shipments of DDP gear should grow 10-fold from $300 million in 1977 to $3 billion in 1982, according to IDC. The charts show the percentages of sectors used in DDP. The intelligent terminal portion is noticeably large because of the inclusion of IBM's 8100 as a terminal based system. As recently as 1975 there were distinct markets for key to disk gear, intelligent terminals, remote batch terminals, minis, small business systems and mainframes. Now they are all in the DDP melting pot.



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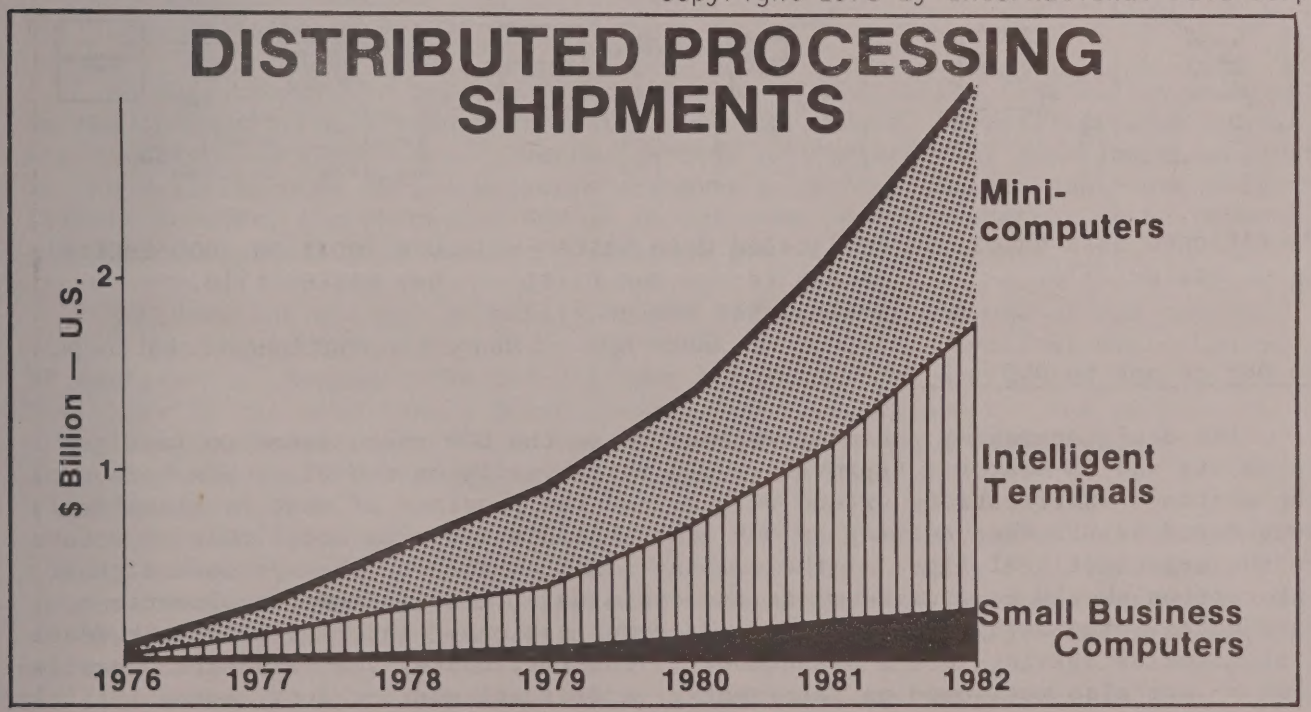

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Users on the move

The popularity of DDP is more than a figment of a marketeer's imagination. Of 100 corporate-level MIS managers at large corporations interviewed by IDC, all said they had at least considered going to DDP. And 53% have begun implementation by distributing to some degree somewhere within the corporation. Ten percent have rejected DDP, according to Ellen Rogers, IDC's DDP project manager.

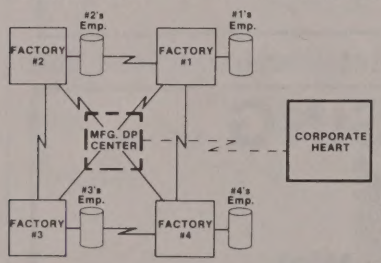
Users indicated they are now reworking central site applications to be used in a DDP environment, in contrast to the pioneer days when DDP was called into use for new applications.

IDC heard repeatedly the fears these users had of relinquishing too much control to their remote sites. Not many offered the capability of local programming, and some said they had tried it and found the idea "disastrous." Thus the DPCX version of the 8100 (EDP/IR October 20), which does not provide local programming capability and does provide central site control, is tailor-made for this market. And IBMers at the conference indicated the 8100 was in response to market studies. (Conference attendees were keenly interested in the 8100 and postponed part of the cocktail hour to listen to two IBMers give somewhat condensed versions of the standard briefings. EDP/IR nominates these two IBMers for the "speaking under adverse circumstances" award.)

Independents that have been preaching that their systems do not allow local programming may find users now willing to believe them since they have heard the identical word from IBM.

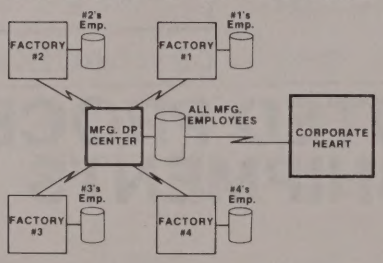
Most respondents want to maintain a master file at the central site.

PARTITIONED DATABASES



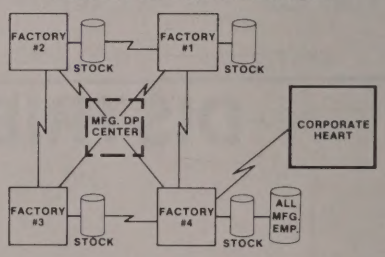
Partitioned data bases -- no master file.

REPLICATED DATABASES



Replicated data bases -- each site has own file; central has master file.

UNIQUE DATABASE



One location, not central, has master file.

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To DDP or not to DDP . . .

The decision-making phase of whether to go the DDP route seems to last between six and 18 months. Approval should rest heavily on non-DP people because the system's ramifications extend well beyond the province of what is classically considered as DP. When setting up DDP, one should attempt to model that structure on the organizational lines of the company. All aspects of the system and their interaction should be considered in the decision. These include: applications, data bases, processing capabilities and communications. Interestingly, the reasons cited as driving forces behind DDP -- control, costs, and corporate organization -- are also mentioned as deterrents. Additional worries are: compatibility;

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software/service support; and coordination, Rogers said. Dixon Doll, president of The DMW Group, Inc., mentioned several potential traps lurking in the land of DDP. Users expect too much; possible fragmentation, duplication of data and/or inconsistent data; loss of control over the DP function; bimodal levels of data accessibility; and escalating people costs from a duplication of central site support activities. "These are things people have been avoiding like the plague."

Doll favors logical data bases that could facilitate applications that are independent of the physical telecommunications and hardware structures. A logical data base would enable users to easily change data structures and values and would eliminate data element redundancy. In the future, there will be a lot more data management function committed to hardware, he stated.

Other problems can arise from the need to integrate multiple data base management systems that handle unlike types of data. But Doll sees a solution arising from new network data base managers that are not associated with any particular geographical node.

How to Start?

The IDC survey found that many companies set up task forces to evaluate whether to go to DDP and to design the system. Often a company gives processing power to the area that has the most immediate needs. In some cases companies select the areas where it is easiest to institute DDP; or they start DDP in order to "get rid of the peskiest and most persistent people," Rogers said.

There is a mixture of gear at DDP sites; terminals and small business systems are used in conjunction with minis. Of the sites surveyed, 45% had minis, 35% terminal based systems and 20% small business systems. In most cases the sites used a combination of the above gear; eight sites had only terminals and two sites used small business systems exclusively.

DDP comes in infinite varieties

Perhaps one of the reasons for the spread of DDP is the flexibility inherent in the concept. For although definitions of DDP abound, in reality there is no one structure or definition. Whereas in 1976 no one knew but everyone guessed at the definition of DDP, now people are even more reluctant to apply one definition. However, the thrust of DDP is to put some power -- whether it be report generation or local programming -- in the hands of the end user.

IDC does not see DDP as heralding the beginning of the end of the central site. Nor should DDP be viewed as the final point in the cyclical evolution of DP management. Remember the trend toward centralization during the late '60s? Now there is the move toward dispersement of processing power. And perhaps the distributed CPUs are destined to becom the nucleii of burgeoning sites -- some of these "small" systems have the power of a small 370.

DDP definitely looks like it will make its mark on DP evolution. Some of the byproducts should be back end data base processors, more efficient means of interconnecting nodes despite different innate protocols, and more buzzwords such as "layering." That's a handy word that can be used to describe the segregation of applications from transmission details as well as the eliminattion of redundancies of interconnect capabilities by packet nets and CPU makers.

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WORD AND DATA PROCESSING BEGIN TO MELD

Time was when a DP department had nothing in common with the typing being done in a corporation's various offices. But those times are fast disappearing, as evidenced by several events that foreshadow a growing trend:

- Small business systems are offering word processing capabilities.
- There's a growing managerial involvement with word processing.

As more people become aware of the inevitable entanglement of word processing with communications, EDP/IR expects a growing number of corporations will put the planning functions for these two areas under the same person or group.

There is a growing awareness on the part of small systems vendors that word processing features can not only cement a sale but perhaps expand the market as well. Much of the impetus for blending the word processing and data processing functions are expected to come from the small users who are more interested in pinching pennies rather than in keeping the word and data domains separate. Some recent announcements:

- Shasta General Systems is offering word processing capabilities on its single terminal system based on the Diablo 3200. The first package offers elementary word processing capabilities and the second will include such goodies as paragraph moving and insertions. The software, priced at dealers' discretion, runs about $2,500 and is intended to be an aid to closing a sale rather than to expand into the word processing mart. However, when Shasta has a less expensive CPU, it plans to tackle the stand-alone WP mart.
- Basic Four Corp. has enhanced its 610 and 730 systems with Dataword, a text editing capability that can operate concurrently with DP. The minimum WP components include a 5120 character display, printer, memory, controllers and software that total $12,500. Documents may be assigned priority levels on the printer. Indicative of the logic inherent in the mini is the capability to call up documents by a wide range of criteria.

At the high end, Wang's Office Information System (OIS/140) provides up to 80.4M bytes of disk, handles up to 32 devices such as workstations, printers, photocompositors, OCR and telecommunications gear, and "combines powerful word processing functions with information processing capabilities, " such as standard math and sort functions. System prices range from $26,000 to $30,000, depending on disk size, and workstations are an additional $5,000 each.

Much of the action is going to come from the addition and/or more extensive use of communications capabilities. Wang has souped up its System 5 standalone with the addition of bisynch communications option that costs $1,000, thus opening the window to electronic mail, accessing big CPUs and performing remote job entry. A System 5 without printer and with the communications option rents for $258.75/mo, including maintenance; enter the office at home. Other goodies include the System 5's ability to share a printer, thus reducing the per station cost. This feature is priced at $500. Wang previously announced information processing capabilities on the Model III of the System 5.

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For those wanting sophisticated looking output, Wang's 20, 25 or 30 can link with a photocomposition system through an interface translator that accepts the WP system's codes and needs only a few extra typesetting commands, Wang claims.

And software vendors are also getting into the act. Compusource Corp. of El Segundo, Calif., is offering Wordpro for Data General systems that use Basic. Wordpro supports both the DG 6053 CRT and Diablo or Qume printer. The package supports underlining, centering, auto-pagination and justification and costs $2,500.

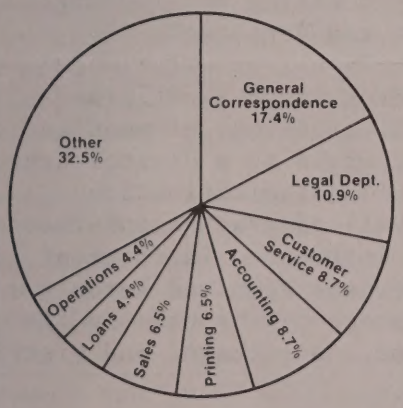
In the WP arena, Digital Equipment has given its WS200 a removable disk and a new VT100W terminal that has a variety of video functions. The system can store up to 8,000 pages of text and software. The maximum system size is four printers and eight terminals, with a per terminal cost of $8,616. At the low end, the WS80 accommodates up to two terminals and uses two double density floppies storing 500 pages of text. A single station system costs $16,490, and a two station system has a per station cost of $11,295.

And, in the good idea department, Redactron's Execuscan puts a slash mark next to each altered line of printed text. Thus, writers need not reread in entirety documents they have submitted for corrections.

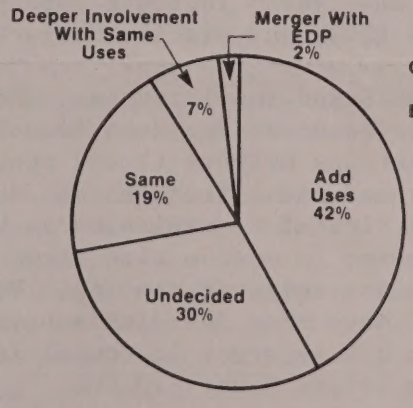
Management aware of WP

EDP/IR expects a melding at some level of the planning for DP and WP functions. While not many large companies now view these two as closely related areas, an IDC survey of over 100 large companies in 10 industries found that there is at least a growing level of managerial involvement or concern with WP. IDC found 58% of the sites interviewed have some top management involvement with WP now, and that figure should be 76% by the end of 1979. Management concern and the use of shared logic systems seem to be functions of the length of time an organization has had WP gear. EDP/IR suspects the corporate management that is now watching WP acquisitions will in time want to coordinate the two areas to ensure future compatibility between DP and WP. Although the two are frequently viewed as separate areas, about one-third of the sample is using CPUs for WP tasks such as in-house printing, managerial reports and mass mailing.

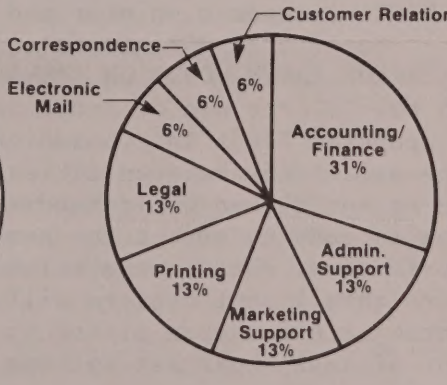
Pattern of Initial WP Use



Future User Plans



Future Applications



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• NCR GOES FOR THE BIG SYSTEMS. No longer content to be the king of the point of sale arena, NCR capped off the year's 116 product announcements with its most powerful systems yet, the V8650 and V8670 that it said are 10% and 15% more powerful, respectively, than IBM's 3032 and 3033. The largest V8670 has five times the internal processing power of the current largest V8000 series, NCR said. Using bus architecture, 64K bit memory chips and emitter coupled logic with 750 picosec gate speeds, the systems are designed for the "large volume transaction processing environment that will characterize the 1980s," Chairman William S. Anderson said. Both systems have up to 128 channels that handle 2M byte/channel. The main processor cycles at 28 nsec and uses a pipelining technique to expedite instruction execution. The systems can be tailored to process programs in a specific language, including Fortran, and use Virtual Resource Executive (VRX) as do V8500s. With the minimum 4M bytes and 32K cache, the V8650 costs $1.8 million; maximum memory is 8M. The V8670 with 4M bytes and 128K cache costs $2.6 million; maximum memory is 16M. Prices include two I/O channel control CPUs and the V8670 price covers 16 channels as well.

• FOREWARNED IS FOREARMED ... OR ... READ AND HEED. IBM's Data Processing Division is now telling the public it is a separate entity from General Systems Division. In a full page ad for the 8100, the message on a CRT reads:

"When we introduced the System/360 in 1964 we helped make the power of data processing more useful to more people than ever before.

"Then we introduced the System/370 in 1970, and brought down the cost of computing and made it available to even a wider range of businesses.

"Now the IBM Data Processing Division is introducing a remarkable new distributed processing system that offers a comprehensive way to help your organization make the most of one of its most valuable assets: information."

• SHIFTING EMPHASIS, California Comuter Products Corp. has found a buyer for its memory division. Xerox Corp. has agreed to acquire the disk drive division except for floppies, thus putting Calcomp out of the disk manufacturing business -- subject of its lawsuit vs. IBM. Calcomp will still have graphics products, including interactive graphics; a marketing arm that handles others' PCM gear; and its maintenance organization. So, the proposed sale would seem to bring the company full circle back to its original plotter orientation. Xerox isn't saying what it will do with the division except that it plans to operate it as an entity, serving current customers. The division will be part of the Information Products Group under Xerox Business Systems, which includes word processing and facsimile, the 9700 electronic printer and 1200, and Diablo, Shugart and Versatec.

• XEROX MAKES MOVES ON AIRWAVES and small systems. Xerox filed a petition with the FCC for use of radio frequencies for data transmission, one element in its proposed Xerox Telecommunications Network (Xten) that would be a digital network using satellites between cities and radio frequencies for local distribution. Xten as envisioned would handle digital transmission as well as graphic information. Xerox intends to market the service to medium size firms interested in document distribution, data transmission and teleconferencing. Perhaps Xten and Xerox's future intelligent copiers will have need for disk subsystems of the Calcomp ilk. In other areas, Xerox picked up 25% interest in Compal Inc., a packager and distributor of small business sytsems priced under $10,000.

• ITEL CORP. SPORTS A SOFTWARE DEVELOPMENT SYSTEM called Maestro which it markets courtesy of Softlab GmbH.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" OCTOBER 31, 1978 • VOL.14,NO.9 P.J.McGOVERN,PUBLISHER

IDC forecasts System/38 orders -- Page 6

TECHNOLOGY PROMPTING EVOLUTION OF SYSTEM ARCHITECTURE

Future large system architecture will have more intelligence in more, different parts, thanks to technological advances in microprocessors and memories. EDP/IR talked with some of the leaders in various fields to determine how advances in microprocessors and memories will affect system architecture and software.

One of the more noticeable trends is the dispersion of functionality within a system which can occur in two ways:

- Dissemination of intelligence in various functional elements of a system such as disk drive and memory.
- Use of special purpose processors such as back end data base units.

Technological developments will continue to provide impetus to scattering intelligence throughout a system, but a key limiting factor could be software. Manufacturers must weigh whether the various hardware developments warrant changes in the operating systems to capitalize on the potential performance increases. Memory is one area where changes are coming on stream rapidly, and the implications extend beyond operating systems to changes in memory hierarchy.

Although there is increasing attention being paid to data flow within a system as specialized processors become more popular, makers feel current operating systems can handle the additional types of processors. The trend toward specialized processors is something of a paradox, comments Dr. George Champine, director of advanced systems for large scale computers at Univac. Basically the move to specialized processors is designed to yield higher efficiency in hardware. But at the same time, hardware costs are declining and becoming insignificant in relation to total systems costs.

Data base computers have a bright future with new technology and inexpensive hardware that offer the capabilities of associative addressing and parallel processing, Champine observes. However, he doesn't see much need for language processors because additional instructions to improve Cobol execution can be implemented in existing processors, and current architectures support Fortran well.

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Not surprisingly, software companies look like they will become the major source of backend data base processors, at least in the immediate future. Cullinane Corp. implemented a prototype backend system by linking a remote PDP 11/70 to a 370/158. And Intel Corp. and MRI Systems Corp. are brewing a data base processor using some work done at the University of Toronto, sources indicate.

Although Jim Thornton, president of Network System Corp., expects a definite move toward specialized processors such as data base systems, he says they are first going to have to come into existence and then there will need to be a period of assimilation of software and communications. However, he agrees with Champine that current operating systems will not need major adjustments to utilize specialized processors. For instance multitasking essentially involves sending a task to another machine. Floating Point Systems has been making algorithm boxes that are called upon by applications programs at a high level.

One of the reasons data base processors are not more in evidence was the lack of high performance communications links, he said. Network Systems Corp. supplies short haul networks that enable one CPU to call another; they work like IBM's channel to channel adapter but are visible to the machine.

While the concept of specialized data base processors would materialize fast if IBM were to endorse the concept with a ring of Series/1s or 8100s around a 303X or 370, Thornton expects the independent software vendors will create the market, just as they have for their data base software offerings, once they get the needed hardware. In fact, Network Systems Corp. is also looking at supplying a data base storage system, perhaps with a CPU from the Intel/MRI effort.

Specialized processors not new

Actually, specialized processors have been around for ages in a very unobtrusive manner. Because of this, operating systems already possess the basics for dealing with future special purpose processors.

One of the obvious tasks to be delegated to separate processors is the input/output function, which many of the mainframers have been doing quietly for years.

- Control Data Corp. in 1965 started putting Peripheral Processor Units (PPU) in its 6000 Series and has continued the practice. The PPUs in the Cyber 70 and the 6000 Series contain their own memory, 4K 12-bit words of core, and can include Extended Core Storage. CDC refined the system in the 7600 wherein each PPU is connected to a specific I/O channel.

- Burroughs in 1975 endowed its B2800, B3800 and B4800 with LSI data link (micro)processors, each specialized for a particular device.

- Honeywell's Model 66/85 has a system control processor to handle I/O and maintenance and diagnostic functions. The SCP interfaces peripherals with the operating system via a 128K-word local memory.

- Xerox Sigma series uses a variety of processors for I/O functions. In the later 550 and 560, I/O processors include a Multiplexer IOP that controls the flow of data between main memory and various peripherals.

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Other tasks assigned to individual processors within a system include maintenance diagnostics and monitoring of environmental conditions. And front end processors, usually separate boxes, have been around and continue to make themselves indispensable in particular configurations. And still other types are scientific or array processors and spooling processors, such as Univac's symbionts.

And at the controller . . .

Intelligence at the controller level, while not new, is growing. With micros, one can expect to see more intelligence placed within the particular devices themselves, such as disk drives. Imsai Corp. in San Leandro, Calif., set the industry to talking a few years ago when it introduced an "intelligent controller" suitable for integration within systems.

By placing some memory at the convenience of the intelligence controlling disk systems, one alters the hierarchy of memory in addition to alleviating the workload of the principal CPU.

For instance, in olden days the memory hierarchy consisted of main memory and its cache, and disk storage. But makers are increasingly looking at the possibility of putting a buffer or cache out in the disk drive itself in order to expedite access.

Using available technology, Memorex has endowed its 3770 with a microprocessor that selects data frequently obtained from disk and places this in its own cache. Along the same lines but with less emphasis on the use of micro to select the data to be put in cache is the concept of a "flubble" proposed by George Sollman of Shugart Associates. A "flubble" would consist of a buffered floppy drive in which one or more tracks are stored in bubble contained in the drive. And the flubble could be only the beginning in hybrid memories, considering that the semi makers are talking about combining RAMs and CCDs in one chip. Thus we have disk memory, cache to cache and main memory. IBM says it has attained true virtual processing by having all memory appear as one level in its new System/38 from General Systems Division (see Page 6).

In the future, we can expect a multitude of intelligent memories, created by the combination of micro and various types of memory as a result of new methods of micro fabrication, such as E-beam. This should shrink the CPU part of a chip to about 10% of its present area, according to Michael Smolin of National Semiconductor Corp. Many of these will have very specific, application-driven functions and will thus need features such as operating systems in firmware, memory protection and more addressing modes, he suggests.

There is already a lot of intelligence sitting in various controllers and makers are finding the use of microprocessors gives them more versatility at less cost. EDP/IR expects to see increased use of dispersed intelligence, either through normal controller functions or under the guise of intelligent peripherals.

Impact of new technologies

A look at various technologies reveals possible changes in memory hierarchies as well as the way we perceive system functions.

For instance, bubble memories could provide a hierarchy of devices that could span the range of disks but be packaged in small space, use one controller

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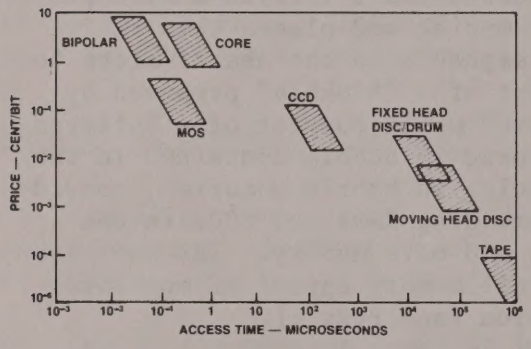
for the configuration, reduce power consumption and facilitate repair through replacement of PC boards. It is conceivable that a series of bubble types could be available where each type represents a different bit density, access time, and cost/bit, according to Gayle D. Lampson of Texas Instruments Inc.

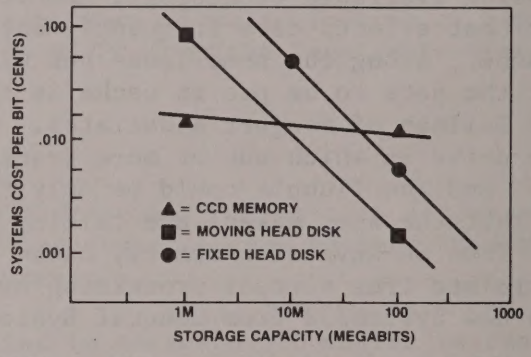
Combining a bubble and microprocessor could encourage the spread of distributed data base networks. An intelligent mass storage peripheral would play a key role in reducing the cost of file management functions in on-line systems because the system could consist of micro instead of a mini and a disk, for a savings of about $10,000, Lampson estimates. Using an intelligent bubble would allow the CPU -- a micro -- to handle the job through higher throughput without needing a large increase in memory.

CCD impact

Charge coupled device (CCD) memories have made it out of the laboratory and more use is expected. Storage Technology Corp. recently introduced its CCD-based 4305, a substitute for IBM's 2305 drum, which has an average access time of 0.7 msec, seven times faster than that of the 2305 (EDP/IR, September 30). Although CCDs are volatile, on a cost basis they are competitive alternatives for mass storage systems.



Price/Performance Comparisons
Source: Motorola



1982 - CCDs vs. Moving Head & Fixed Head Disks -- Source: Motorola

	MOS RAM	CCD MEMORY
ACCESS TIME	150–350 nSEC.	100–900 μ SEC.
TRANSFER RATE	2 MEGABITS/SEC.	1–5 MEGABITS/SEC.
TYPICAL STORAGE CAPACITY	16K-BITS/CHIP	64K-BITS/CHIP
READ ERROR RATE	10^{-11} – 10^{-13}	10^{-11} – 10^{-13}
MTBF (HOURS)	7000	7000
NON-VOLATILE	NO	NO
COST/PER BIT	70 MILLICENTS	35 MILLICENTS

1978. CCDs can achieve higher bit densities and lower cost/bit than MOS RAM.
Source: Motorola

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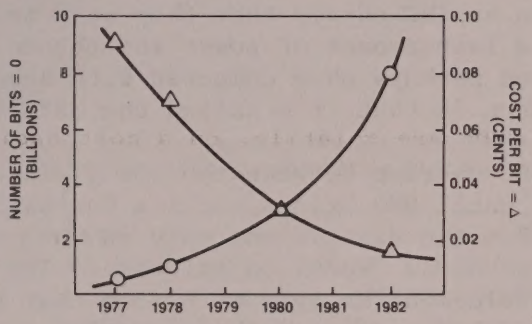
A combination chip containing CCD and RAM could reduce the need for RAM in a system and thus alter the hierarchy of memory, according to Ian Le Mair and Doug Powell of Motorola. The RAM/CCD chip could contain the control logic needed to make the chip appear as a RAM and the internal RAM would act as a cache for the CCD memory. Such memories could have access speeds of 100- 300 nsec, comparable to main memory speeds, they said. To take advantage of the intelligence in a hierarchical memory system, structural changes will be needed in software.

While on the topic of memories, one can also expect the Electron beam accessed memory (Ebam) to emerge from the laboratory in the '80s, according to Donald O. Smith of Control Data, formerly Micro-Bit Corp. These devices should be in the range of 256 Mbytes, and will have speeds that can be viewed as nearly zero access time or less than 100 usec. Ebam can be used as either a disk replacement, a cache for a disk, a staging memory or a direct access memory.

The message is clear: there will be more memory, more varieties of memories in more parts of systems. As the cost declines, the principal consideration will shift from efficient use of memory to use of memory to make efficient systems. The graph at right is but one indication of how memory prices are falling.



Worldwide Memory Consumption
Source: Motorola

But not only will there be memory in more parts of the system, there will be more intelligence scattered about. And when one considers the combination -- and eventual integration into one chip -- of these two elements, EDP/IR thinks future systems could be quite intriguing. The unknown is the software required to make complex systems appear simple.

Semi makers tackle software?

Semiconductor makers, already aware that software costs are the dominant consideration, may tackle that aspect of computing and turn their energies to operating systems on a chip. Already the advance guard has appeared in Western Digital's Pascal processor on a chip set. This has to be the ultimate, at least in minuteness, in language processors. Pascal Microengine is based on the University of California, San Diego's version of Pascal and reduces memory requirements of the UCSD system by at least 25% by eliminating the host operating system and interpreter, Western Digital claims. The chip set is comprised of four components and sells for $195 in single versions and $97.50 in lots of 10,000.

The creation of special purpose processors, in the realms of both mainframes and microprocessors, places more emphasis on intrasystem communications while alleviating a lot of daily tedium from the central processor.

Semiconductor makers may find changes. Starting with the premise that almost nothing is technically impossible, the focus then moves to the question of what the market demands. Semi makers may find that the future is somewhat hazier because of the entrance of the market demand factor, according to C. Lester Hogan, vice-chairman of Fairchid. Until now the market has taken whatever semis made.

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IBM UNPACKS S/38 AS S/3 UPGRADE;
IDC SEES 50,000 ORDERS BY YEAREND

Within a month, we've seen IBM's Data Processing Division and General Systems Division race each other to the replenished grab bag of new technology. And the race is not quite like those in times past, because instead of running on separate tracks, the lines between their territories have become very blurred. We can expect to see more elbowing as they become accustomed to their new freedom to encroach on what was previously perceived as the other's territory. Interestingly, the announcements of the 8100 by DPD (EDP/IR, October 20) and the S/38 bore earmarks of rush; IBMers were receiving their briefings on the 8100 after it was announced to the world. And a couple of weeks later, GSDers were also scurrying to learn about the S/38.

Bascially the S/38 is billed as a path for System/3 users, many of which indicated in an IDC survey that they were thinking of going to a different system. It packs a fair amount of power for the dollar, especially when compared with the 3 line, and perhaps when compared with some of the lower end 370s. Is there any significance in that it's called the 38? There's the 138, but also the 3/8.

If the overlap between the two divisions' product lines appears to be growing, just wait until DPD brings out its Series E -- then the fur should really start to fly. But the race is not only in who can use the new 64K bit chips and other hardware goodies. Focus on software. The 8100 had some attractive features such as the Development Management System that guides users through program creation and generates Cobol code, and the operating systems that facilitate distributed data processing. But the S/38 is not without something new, something that probably represents a significant leap in IBM's concept of memory management, making virtual storage easier to use. With the Control Program Facility, both main and disk memory appear as a single, very large virtually addressed storage space. The technique is different from that inherent in the 370 and 30X series.

Data base management has been a hot topic for a long time, but now IBM is becoming more active in this area. The operating system allows physical data files to be defined independently of applications programs, thus allowing different users to access data in different ways, via part number, vendor name, etc.

Continuing a trend started in IBM with the the Series/1 and 34, and adopted with the 8100, the S/38 operating software is unbundled. Thus comparison of 3 and 38 prices are tricky. Quickly scanning the key hardware and software points of the S/38:

- New logic in the form of a chip with up to 704 TTL circuits in 4.6 square millimeters; the CPU fits on a 10- by 15 in. board. The chips have 28 times the number of circuits per chip in a S/3 and operating speeds 3 to 5 nsec vs. the S/3 chips' 8 to 12 nsec.

- Use of same 64K bit RAM as the 8100 but these are packaged to provide 256K modules. There are also 32K and 18K chips (the 8100 CRT used 18K).

- Unbundled operating system with single level storage management feature and data base facility. RPG upgraded to RPG-III.

The manufacturing technology inherent in the fabrication of the logic and memories borders on space age. IBM has attained design flexibility through the

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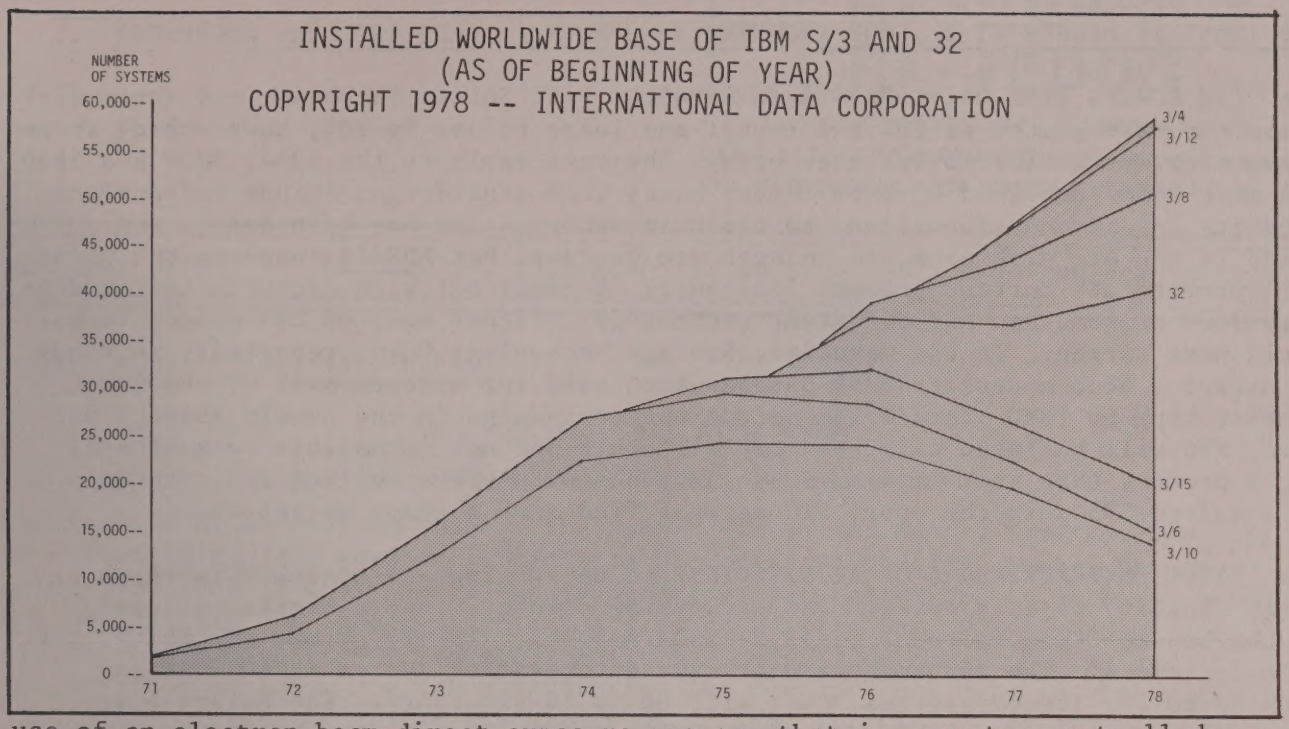

use of an electron beam direct exposure process that is computer controlled. Thus a standard chip with 704 logic cells can be transformed by the electron beam process into the desired pattern of circuit interconnection. Memory wafers are transported -- and suspended -- by air in horizontal funnels through various processes of fabrication.

Market size?

The market for S/38s should be healthy. There are over 37,000 System/3s installed as of year end 1977, and close to that number of S/32s and 34s installed or on order. International Data Corporation estimates that by year-end 1978, IBM will have secured 50,000 orders for the S/38.

Where does it fit?

The S/38 appears to begin where the 3/15 ends -- at least if one can judge by minimum - maximum memory capacity. The S/38 comes with 512K to 1.5M bytes whereas the upper limit of the 3/15 is 512K. And the S/38 can support up to 387M bytes of disk. Judging from monthly rental prices, the S/38 fits somewhere between the 138 and the 3/10.

Basically, the S/38 is described as tailored to a work station environment and appears to be an upgrade for batch oriented S/3s. The systems don't communicate with each other and can report to a limited number of 370s. Up to 40 workstations, the same type as for the S/34, can be attached directly. For S/3s wishing to upgrade, there are conversion aids for batch users and users of the 3's Communications Control Programs. But S/34 users are out in left field and will have to rewrite their programs.

Hardware comes in two versions: the Model 3 with 1100 nsec main memory cycle and the Model 5 with 600 nsec cycle time. A CPU with 64.5M disk and 512K begins at $70,210 or $1,750 lease and with 1.5M extends to $180,245 or $4,700. The Control Program Facility leases for $400/mo.

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• IBM LOWERS DISK DRIVE PRICES IN APPARENT FIRE SALE. The Giant cut large disk drive purchase prices by 20% and rental and lease prices by 10%, thus making these items more attractive to its user base. The cuts apply to the 3344, 3350 and 3830. The move seems designed both to thwart users from considering future independent products in the near future and to clear inventory. IBM has been suspiciously quiet in the big disk area and changes are overdue, but EDP/IR suspects the Giant will promote its current product line until it comes out with either a triple density 3350 or some new and different technology. Either way, we can expect to wait until next spring. In the meantime, Storage Technology Corp. reportedly is ready to market a double density 3350 but has been awaiting announcement of the same product type by IBM. Should IBM decide not to indulge in the double density version, STC will be faced with the more difficult but not impossible task of selling a product that is unannounced by IBM. But with users rolling their recently acquired 3350s in the door, STC may not find such a ready market.

• TANDEM EXTENDS NON-STOP ARCHITECTURE to networking and adds English-type query facility to data bases. The networking scheme is but a logical extension of the Tandem CPU's internal message handling, which is via packet switching, the firm explained. The Tandem "Guardian/Expand" operating system extensions can link up to 255 Tandem systems, each with up to 16 procesors. The Enform query capability could reduce the number of applications programs needed because users can construct the desired report formats and easily access data from anywhere within the network. The combination of the two capabilities, plus the basic CPU's reliability, could give some T/S service users pause for thought. The Expand will cost $10,000 plus $1,500 to microcode each processor; Enform will cost $7,000 plus the same microcoding charge.

• QUME JOINS FLOPPY VENDORS with a dual sided double density drive that reportedly reduces media wear to below industry norms. Qume, which is being wooed by ITT, also plans to produce a 5 in. drive soon. Prices are designed to be competitive with Shugart and are $755 in lots of less than 25. With Xerox backing Shugart and ITT linking with Qume, the mini floppy arena could be the battleground of giants.

• SEMI MAKERS MOUNT ATTACK ON MINIS IN COURT. Fairchild Camera and Instrument Corp. is tackling Data General and National Semiconductor is taking on Digital Equipment in suits filed in California. National plans to market the Series/200 line of minis that will be software and I/O compatible with the PDP 11/34. It hasn't released more product information. National alleges it has not infringed DEC patents and terms these invalid and unenforceable. Fairchild charges DG with attempting to prevent competition through tying in software and hardware marketing. The specific products involved are Fairchild's 9440 Microflame and DG's Micronova. The list of lawsuits against DG is growing.

• NOT IGNORED, Control Data Corp. Cyber 170, 70 and 6000 Series users can at last obtain their version of the Mass Storage System CDC has been supplying to IBM users. The CDC 7880 is the Cyber version of the 38500 and costs $362,365.

• COULDN'T GET 'EM OUT THE DOOR is the reason Computer Automation expects a pre-tax loss of $1.5 million or $900,000 net for the first quarter ended Oct. 1. Manufacturing problems caused by substandard components in the Naked Mini Division and slipped schedules for a new test system were the culprits. CA expects to catch up with delayed backlog by the end of the second quarter.

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"THE GRAY SHEET" OCTOBER 20, 1978 • VOL.14,NO.8 P.J.McGOVERN,PUBLISHER

Through the Looking Glass Darkly

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IBM JUMPS INTO DDP WITH 8100; 'BIGGEST ANNOUNCEMENT SINCE 360'?

Almost as if Alice stepped through the Looking Glass and discovered that many of her erstwhile minions were entranced with dispersing processing power, she too donned the cloak of distributed data processing, but called it "cooperative network processing." Although distributed data processing has evolved from a concept to an entity being implemented, the trend happened without the consent or participation of IBM. Now IBM has "blessed the concept" not only in the traditional data processing domain but also with systems for the office and manufacturing environments. The three-pronged approach could wreak major changes in the DDP evolution.

Certainly IBM's participation will enlarge the domain of distributed processing users. The impact on others in the industry is harder to assess. The immediate impact will be a sharp drop in orders received by others during the last quarter of 1978 while users digest the implications of the announcement and try to decipher how much power they are getting with the relatively large amounts of memory -- 256K minimum.

The 8100 appears to be what large IBM users have been wanting: a DDP system with central site control over what is going on in the provinces. At the same time the 8100, with a different operating system, enables users to scatter 8100s about in a network of peers, each of which can be autonomous. Other pieces of news:

- IBM unveiled systems for use in manufacturing and office environments, thus covering the primary areas where users want DDP.
- Memory as low as 1.8 cent/byte with a 64K chip, thus leapfrogging GSD's previous IBM low of 5.8 cent/byte on the Series 1.
- Unbundled operating system software, giving a large clue as to where IBM expects to reap revenues in the future.
- Peripherals include a very capable CRT with its own microprocessor and 18K chip, a tape drive of entirely new design, and 25% reduction on the price of existing 3791 controllers.

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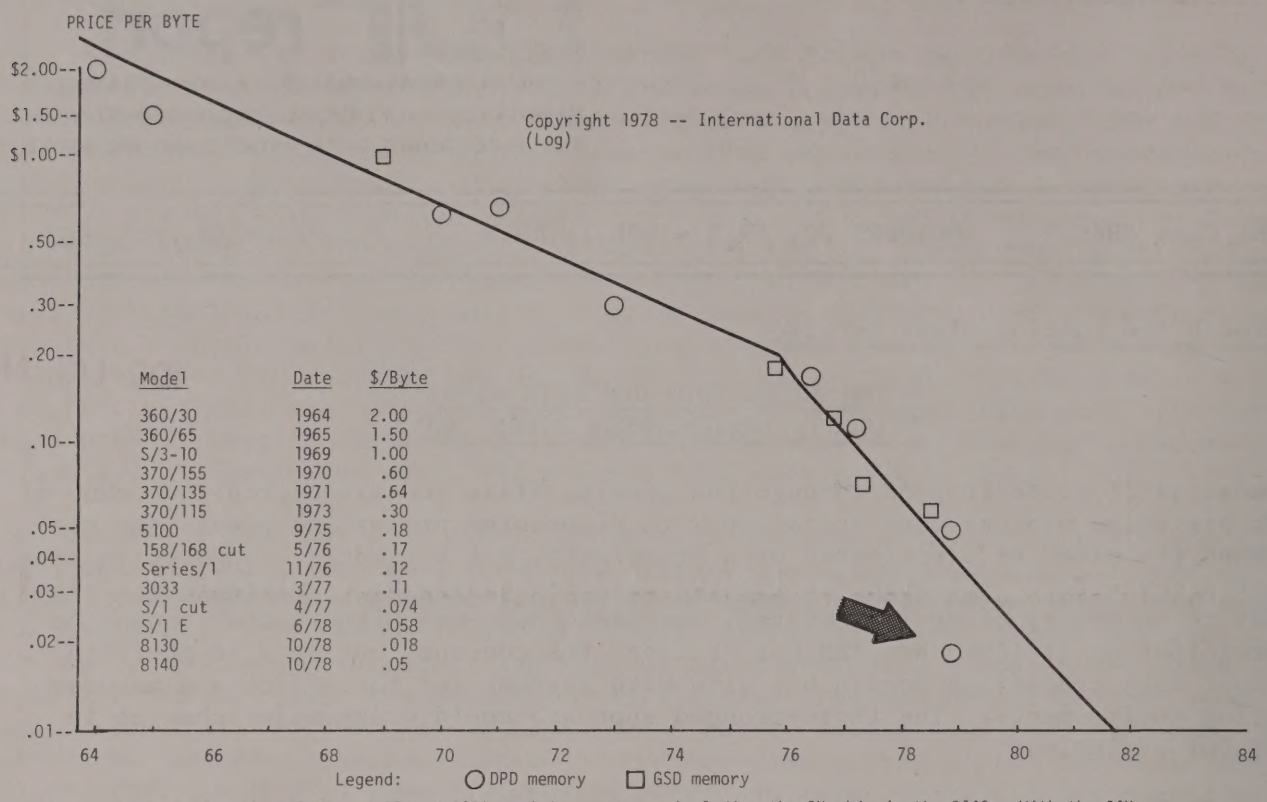

Traditionally, DPD has followed GSD's pricing pattern, including the 3K chip in the 8140. With the 64K chip in the 8130, DPD leapfrogged GSD. EDP/IR believes the 1.8 cent/byte will remain IBM's lowest memory price for a while as the Giant probably has set the price at the midpoint of its learning curve.

Although there are some spiffy hardware items such as 48 general registers and eight interrupt levels which are switched entirely by hardware, much of the power and allure of the 8100 appears to lie in the software. (The latest Series/1, Model 4955E, is a more powerful machine than the 8100, which is designed for interactive usage. One GSDer wistfully surmised that the 4955E with 8100 software would really be the system to have. But, alas, such is not to be.)

Now more than ever, software is the determining factor in a user's selection of a system. And IBM White Plains has taken a page from little brother in Atlanta and unbundled all software, including operating systems.

In digesting this announcement, EDP/IR advises one not overlook the significance in IBM's term "cooperative network processing" or the comment by one IBMer at a user briefing that the 8100 is the "biggest announcement since the 360." The 8100 may not embody the latest trends in DDP, such as Datapoint's processors for specific applications with the ability to access data elsewhere, but it is what IBM is offering, and that counts for a lot in this business.

Memory drops to 1.8 cent/byte

EDP/IR suggests one reason for the low price of the 64K chip memory is to soften the blow that the operating systems consume at least 128K of a minimal 256K configuraion. The 3K chip memory on the 8140 is nearly twice as fast as the 64K in the 8130, and also nearly triple the price. All IBM says about the 64K chip technology is that it is N-channel, metal gate field effect transistor. The 8775 terminal contains an 18K chip of the same manufacture.

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WHERE DOES 8100 FIT?

- The 8100 fits squarely into the SNA/SDLC plan, but also supports bisynch communications and downstream to terminals, start/stop. Thus another indication of IBM's willingness to form a bridge to bring older equipment into the SNA arena.

- On a bare-bones basis, the 8100s come close to the price of recent Series 1 (EDP/IR, July 14). But the faster 8140 approaches the speed of the slower version of the 1E.

- In many ways it looks like the sequel to the over-priced, inflexible, not-too-popular 3790 of which IDC estimates there were about 400 installed as of the end of 1977, running 2,000 keystations.

- The system represents what died-in-the-wool IBM users have been telling independent vendors they want: central site control. This offering will make the sales task of others more difficult and probably cause some users to reevaluate their independent commitments.

- But surprisingly, IBM offers users two versions of DDP: the other version enables users to program their own 8100s and have autonomous sites. The Distributed Processing Control Executive (DPCX) is the follow-on to the 3790 approach and embodies central site control. The Distributed Processing Programming Executive (DPPX) facilitates programming at remote sites.

- The 8100 can operate as a stand-alone or communicate to other 8100s with or without linking to a 370.

- The availability dates -- last part of 1979, early 1980 -- appear to correlate with when Satellite Business Systems plans to be operational.

- The series is representative of the internecine competitiveness emerging between divisions. The 8100 is the Orbit; the Pacific or S/3 replacement is expected by month's end from GSD, and the E Series probably not till 1979.

* * * * *

The 8100 was but one of three product announcements, which, taken as a whole, form an interesting, well-planned attack on nearly all aspects of large users' DP-related needs.

- The office. The 3730 distributed office communication system -- with new CRT and printer -- is based around new models of the 3791 controller and is designed to be attached to a host 370. The 3730 can operate as a standalone, but needs a 370 to communicate with other 3730s. One can procure word processing from Office Products Division General Systems Division, or Data Processing Division.

- Manufacturing. IBM announced general availability of the 3630 plant communication system. It is supported by both 8100 and 370. With the 8100, it can become part of a larger SNA system.

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The new low price puts the pressure on the add-on makers as well as mini-makers, both of whom have been having a field day under IBM's price umbrella.

The memory pricing may be the first of several signs that the Systems Products Division, with its new charter that includes everything that is not large-scale (EDP/IR, Aug.14), can be expected to become increasingly aggressive both in technological innovations and pricing.

Software unbundled

The unbundling of software gives a good idea of where IBM expects to increase its revenues. But at the same time, the move could open up this whole arena for independents. The monthly cost of software for the 8100 could amount to half the price of the total system.

The choice of operating systems enables the user to configure a network that is controlled completely by the central site (DPCX), an extension of the 3790 philosophy, or a network with independent devices (DPPX). The Development Management System not only guides users through the creation of application programs in English-type commands, but produces Cobol code.

Distributed Processing Control Executive	Distributed Processing Programming Executive
Intended for a "host-connected environment with customer-managed control of the 8100 processor. No facilities (e.g. source code, compiler, or linkage editor are available for modification of programs at the remote location." Executes up to 31 application programs concurrently.	Offers flexibility. Such systems can be standalone, integrated into a "cooperative network of host and peer systems," centrally controlled or autonomous.
Host Command Facility -- enables central site staff to check, operate or program any 8100 in network.	Host Command Facility
3270 data stream compatibility -- 3270 or 8775 attached to 8100 can access 370	3270 data stream compatibility
RJE support	RJE
Message switching support	Access to central files
Central library support	Host transaction facility (SDLC) -- interface to IMS and CICS
	Development Management System
	Cobol, Fortran, Assembler, Linkage Editor
	Data base and Transaction management system "automatically manages transactions and files." Similar to CICS/VS

Communications between 8100s are SDLC; between 8100 and 370, bisynch or SDLC, and from 8100s to terminals, start/stop. The maximum speed from an 8100 to 370 ranges from 9,600 bit/sec under DPPX to 56 kbit/sec under DPCX.

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8100 PRICES

Item	Monthly Rental ($)	2 Year Lease ($)	Purchase ($)
Hardware			
8130 processor (512K memory, 1M diskette, 64M disk, 1,500/sec CPU internal operating speed)	917	780	29,940
8140 processor (512K memory, 1M diskette, 64M disk, 800 nsec CPU internal operating speed)	1,786	1,520	46,980
8130 memory (64K chips, 975 nsec access time) 128K increment	82	70	2,250
256K increment	165	140	4,500
8140 memory (3K chips, 550 nsec access time) 128K increment	306	260	6,240
8775 display, 2,560 char. screen	95	81	3,645
(Up to 3,440 char.) 18K chips	104	89	4,005
8809 tape unit (no capstans or vacuum, 1,600 bit/in. tape mounted horizontally, data rate 60,000 to 120,000 bit/sec)	341	290	10,440
8101 storage unit with 64M disk (expands disk, communications, eliminates need for 3270 controllers)	524	446	16,410
3287 Model 11 (80 char./sec) printer	196	167	5,875
Model 12 (120 char./sec)	233	198	6,250
3289 Model 3 (400 line/min with 48 char.)	556	473	13,250

Software	Monthly Rental	Characteristics
DPPX/Base	150	Occupies 128K + depending on applications, number of terminals, etc.
Cobol compiler	80	
Cobol library	15	
Fortran compiler	60	
Fortran library	30	
Development Management system	85	Guides user through program creation, generating Cobol code
DPCX	215	Occupies 243K - 340K bytes for operating system and applications. 243K supports 3277s and 3286, 3287 printers. 340K also handles tape, RJE, 3289
Host Command Facility	85	
Transaction Management	90	

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SYSTEM PRICES $90K MAGIC NUMBER

	Monthly Rental ($)	2 Year Lease ($)	Purchase ($)
3730 office system:			
3791 controller			
5.5M	1,159	986	32,660
24.1M	1,510	1,285	44,860
3732 display	112	95	3,325
3736 printer (55 char./sec)	250	213	7,455
3730 with large 3791, two printers, 10 CRTs			93,020
3630 plant system: 3631 controller, six 3641 reporting terminals with scanners, two 3643 display terminals, two 3642 encoder-printers and a 3645 printer			92,658
8100 small: CPU with 384K, 58M disk, three printers, communications link and six terminals			91,815
8100 larger: CPU with 512K, 58M disk, mag tape, five printers, communications links and 18 terminals			181,702

Increasingly the name of the game is software, so comparing bare bones prices can be misleading. However, for those curious as to how bare bones prices of CPUs stack up, here are some purchase prices:

8130 Model A21, 256K, 29M disk, no fixed head capacity	24,000
8140 Model A31, 256K, 29M disk, no fixed head capacity	33,060
8140 Model A34, 256K, 58M disk, 128K fixed head	35,220
Series 1 Model 4955E, 256K	22,400
Data General Eclipse 150, 256K	37,000

For those wishing to compare on a systems basis, Data point's Arc system offers the advantage of including all software in the purchase price:

Datapoint Arc: 512K memory, removable disk, six terminals, three printers, seven CPUs, communications links, software	92,000

Whither the 3790

Although the 8100 announcement would lead one to write an obituary for the 3790, the machine isn't dead -- yet. Instead, the new 3791s, which are bigger and more expensive than those on the market currently, form the heart of the 3730 office system. IBM at the same time cut prices by around 25% on the existing line of 3791s and memory. The top of the line existing model now sells for $30,900 instead of $40K. But the 3790 concept -- which allowed top-down central site control, is very much alive and is the basis for the DPCX operating system.

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Here we go loop de loop

To glue together various elements of the 8100 and plant system, IBM has introduced its loop technology. The connections between devices are not coaxial cable and not fiber optics, but two pairs of twisted wires. Generally they conduct signals at 9,600 bit/sec, but for the terminal and printer the transmission can be up to 38.4 kbit/sec, four times faster than other loops. Because there are two pairs of wires, the signal will be carried by one pair if a failure occurs in the other. For the day when the fork lift accidentally severs a whole wire, the signals may be sent the other way by turning a key in the loop's wall socket. The loop normally can cover a distance of two miles, but can be extended to four, thus eliminating modems within a plant. The loop is a good example of how IBM uses technology to make users want to stay within the fold.

Repair kits for the uninitiated are one of the more ingenious features of the 8100. The diagnostic procedure is simplified by a suitcase system that contains a micro, 32K plus floppy drive and tiny, handheld terminal with an LED display that flashes instructions in English.

And what of the future?

The impacts of the goodies unveiled in the recent announcement are numerous and somewhat easier to examine when taken individually. The total picture is one of a larger distributed processing market, but a harder sell versus IBM.

- DEC knows the DDP market and is established, expecially in the manufacturing sector. Thus IBM takes on the aura of the new kid on the block -- temporarily.

- IBM has upped the ante in the plug compatible CRT game with the increased capabilities in its 8775. Now, terminal makers will probably follow into this market, but will bear in mind that the controller market is not up for grabs -- unless they want to create a machine that functions as an 8100. Raytheon and others may well opt for the 8100-type route, but the terminal vendors will have to put more function in the tubes, not the controllers.

- The move bodes well for users. No longer is IBM a monolith; the teeth are all but bared between GSD and DPD. Thus we can expect GSD to come up with a machine that could extend in power well into the 370 range. This should have the plug-compatible mainframers wary at best. The dividing lines between GSD (formerly small systems) and the rest of the company have blurred. Sharing of products seems to be minimal -- although it does look as though DPD is using the same disk that is in the Series 1 and the 32 and 34.

- Unbundling of operating systems could provide opportunity for enterprising souls. After all, the packaged software industry was born when IBM unbundled applications software.

- But while IBM unbundled software, it carefully bundled disk drives into the CPU and the 8101, a device that has a function similar to that of a controller. To add disk drives, one must add 8101s. Each 8101 has one disk up to 64M bytes. The maximum disk storage on an 8130 is 192M, and 320M on an 8140.

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• AMDAHL SETS ENGINES REVVING WITH V/8, the new top-of-the-line that is reportedly 20% to 30% faster than the V/7, especially in airlines-type environment with lots of interactive usage. Amdahl also enhanced the V/5 to the V/5-II which offers twice as much memory and 10% better performance. And, not neglecting the rest of its line, it lowered typical systems prices 7% across the board, reduced the price of V/7 memory by $25,000/Mbyte and raised U.S. maintenance prices 5%. The V/8, due out September, 1979, has a pre-fetching ability and faster internal cycle time - 26 nsec vs. current 29 nsec. It will cost $3.28 million for a minimum 4M, 12 channel system. The V/5-II will cost $2.1 million for 4M and 8 channels. The V/5 and the V/7 can be upgraded to the V/5-II and V/8, respectively.

• BURROUGHS CASTS NETwork architecture to gather various types of processors into its net via X.25. The Burroughs Network Architecture (BNA) allows terminals and computers to access information stored in data bases throughout the network, thus opening the door to further use of distributed processing among its base. BNA links elements of a network on a logical and dynamic basis, thus offering flexibility in configuration, the firm said. Links can be via leased or dial up lines and X.25 packet switching services. BNA, which should be available in the fourth quarter 1979, will be licensed for each computer on either an unlimited time plan or two limited time plans. Monthly fees under the five year plan range from $192 to $672.

• DATA GENERAL, HP EXPAND LINES with small systems. Data General has a new low end model in its Eclipse line, the C/150, which starts at $75,000. At the upper end, DG doubled the memory capacity of its M/600 to 2M bytes. With its automatic segmentation facility for Cobol, DG makes it easier for large (IBM) users to transfer programs to DG's Eclipse without reprogramming to accommodate memory limitations.

And Hewlett-Packard put its silicon on sapphire technology to use in two desk-size computers: the 300 and the 3000 Series 33. The 300 can support up to 16 terminals and is intended for small business OEMs and large users. The $36,500 price includes the Amigo operating system designed to facilitate creation of application programs, Basic or RPG II, 256K, 1M floppy and 12M disk. Maximum memory is 1M. A subset of Image/3000 data base management system is available as a $2,000 option. The 3000 Series 33 begins at $70,000 and uses the same operating software as the Series II and III. EDP/IR suspects HP will endow the 300 with networking capabilities, thus making it the low end linking with the 3000 line.

• WORD'S GETTING OUT THAT WORD PROCESSING IS IN. Basic Four added word processing capability to its Basic Four System 610 and 730 so the machines can perform DP and WP concurrently using the same data base. Minimum components of the Data word enhancement -- one text display terminal, one printer, memory, controls and software, cost $12,500. This offering is completely distinct from another MAI company's product, Wordstream, that is a dedicated word processing system.
. . . And the Social Security Administration has ordered over $5.5 million worth of shared-logic word processing gear from Four Phase Systems for use by the SSA's Bureau of Disability Insurance and Bureau of Retirement & Survivors Insurance.

• MICRODATA GOES DIRECT WHERE DEALERS DON'T DELIVER. That's the story behind the minimaker's establishment of branch sales offices in San Francisco, New York and Miami. While the company has no definite plans to eliminate dealers, it does intend to take over where dealers don't perform as planned.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" SEPTEMBER 30, 1978 • VOL.14,NO.7 P.J.McGOVERN,PUBLISHER

Inside: Attached Processors and PCM CPUs

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DISK MAKERS MOVE TO CATCH A MARKET ON THE RISE AS STORAGE TECHNOLOGY AND CDC BRING OUT NEW, HIGHER CAPACITY OFFERINGS

Two of the big guns in mass storage have recently announced new disk products with greatly enhanced performance capabilities. Both are plug-compatible devices designed to go toe-to-toe with IBM disks, and both outperform anything the Giant has so far offered. IBM spokesmen, naturally, have kept mum about the company's plans to introduce disks with similar capacities.

The STC device, dubbed the 4305, is the first of its kind, featuring the new charged coupled device (CCD) technology. The solid state disk is designed to be compatible with IBM's 2305 line, but with higher data transfer speeds. By using the solid state chips in the 4305, STC has brought more reliability (no moving parts) and more speed (data retrieved electronically) to mass storage in this performance range, says STC. So much for spinning disks.

The CDC disk, the 33502, uses enhanced "Winchester" technology to double the capacity previously available to users of its IBM counterpart, the IBM 3350. This has been achieved by increasing the number of data surfaces and recording heads in each module . . . and packing more data tracks per module.

EDP/IR makes these notes about the two announcements:

- Until now, the 2305 had little competition. But the 4305 so outperforms it that it is almost guaranteed a large chunk of IBM turf.
- The improvements that CCDs can bring to mass storage of disk performance -- as witnessed in the 4305 -- are sure to find root in other, less costly solid state "disks" (one senses a new buzzword in the offing).
- The disk market is booming -- total capacity sold this year could jump by over 60% this year on the strength of large mainframe sales. This bodes well for the CDC 33502.
- In offering the 33502, CDC would appear to be plunging back into the PCM market after a period of OEM concentration . . . in what may be a conscious move to catch a market while it's hot.

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STC seizes the lead; IBM must play catch-up

The STC 4305 solid state "disk" was designed to replace the fixed-head disk -- specifically the IBM 2305 (which is technically a "drum") -- and were it not competing with the vaunted IBM label, might do exactly that. As it is, don't expect today's mechanical mass storage devices simply to roll over and die. But there is a high level of interest in the 4305 -- it's certainly got sex appeal -- and a look at the performance specs hints why.

Fully configured, the 4305 offers 45 MB storage compared to an upper limit of 23 MB for the 2305-2 . . . and for about half the cost ($150,000 to $400,000). Four memory capacities are available, starting at 11.2 MB for the 4305-1 and increasing 11.2 MB at a clip to 45 MB for the 4305-4. The average access time is 0.7 milliseconds . . . or seven times faster than a 2305, fifty times that of a 3350. STC sees a device of such performance as ideal for paging applications.

(The maximum access time is 1.4 milliseconds: the time it takes for a bit of data to travel the CCD's 4,096-bit loop. The CCD itself -- see EDP/IR, August 29, 1975, for an explanation of CCDs -- is organized as 16 4,096-bit serial shift registers. Within them, the data bits are constantly circling.)

Because of its use of electronic switching, the 4305 can offer three different data rates (1.0, 1.5, 3.0 MB/second); the IBM 2305 can handle only 1.5 MB/second. STC has also prepared the way for the day of the 6 MB/second channel by building channel-attaching capability into the 4305. According to STC, the 4305 -- by virtue of its use of chips and careful packaging -- will require, at worst, half the space and power of the 2305.

CDC doubles capacity for IBM users

The 33502 represents a renewed effort in the PCM market for CDC . . . and the timing of the announcement indicates that they are either not worried or are prepared for however IBM reacts to the challenge. The move is perhaps also an indication of how frustrated large disk users have been until now.

The 33502 disk storage subsystem provides 1.27 billion bytes of storage per two-spindle cabinet . . . with each 635 MB disk storing twice what an IBM 3350 can. The 33502 can also provide twice the total capacity: 20.3 billion bytes. A four-cabinet, eight-disk string of drives can store more than 5 billion bytes; and four of these strings can be attached to a single control unit.

CDC says the rotational delay on the big disk is 8.4 milliseconds and that the average access time is 19 milliseconds . . . somewhat faster than the 3350. An option called "dual access" allows a second CDC controller to access each string of drives for simultaneous data transfer to or from any two drives in each of the strings, improving data throughput up to 25%. Data transfer: 1.2 MB/sec. The CDC disks are linked to CDC's 38302 universal controller, which can also run CDC's 3330 PCM disks. Different size drives can be mixed. Prices start at $59,600 for a single cabinet . . . half the equivalent IBM 3350 price.

CDC should have a ready market -- the disk demand is there -- but also runs the risk of preceding an IBM announcement that could be imminent. If IBM doubles its 3350 capacity, say, but with differing technology, CDC may be left out on a limb. But undoubtedly the company is aware of that and knows what its users want and need. The company is usually astute in preguessing IBM.

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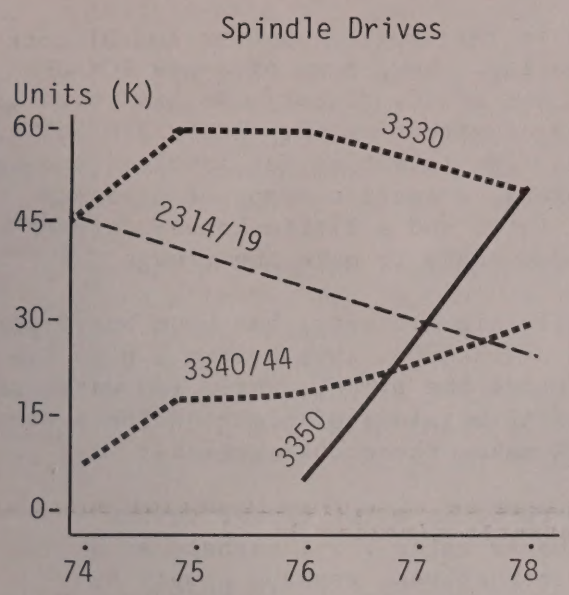
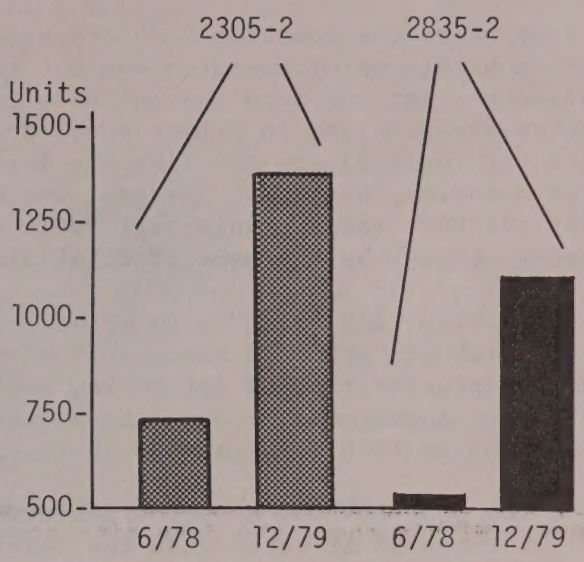
A LOOK AT THE DISK MARKET





4305 keys on paging applications

STC is aiming primarily at large systems users of IBM MVS and MS operating systems who will benefit from the increased throughput the 4305 offers in paging applications. STC says that while other types of data can go on the 4305, it is not recommended unless it's read-only or the user has a UPS power supply, as the 4305 is volitile.

Interest in the 4305 has been very high. STC has already gotten 40 letters of intent in pre-announcement talks with customers totaling 130 systems worth $25 million if sold. Most of the orders have been for single systems, but many have been large. AT&T Long Lines, for example, reportedly has ordered 32 4305s, up from an original order of 24 systems, says STC.

Shipments for orders placed now will start in January '79 and should be completed by year's end. STC says the entire year's planned production is nearly sold out now (a projected $37 million worth of business) but expects that components vendors Fairchild and Texas Instruments will be able to meet the demand.

DCD disk to tap rich 3350 vein

The 3350 installed base is growing rapidly, jumping upwards by roughly 15,000 units a year since '76 to a possible total of 50,000 units by yearend '78. Even a small percentage of this increase will make the gamble that IBM will respond in kind worthwhile. Such as announcement would also give tacit IBM endorsement to the 33502, expanding its market even while competing directly with it. At very least, the 33502 will serve as a prototype exhibiting CDC's ability to produce high technology disks. The rumour mill thinks CDC has made the right move.

Production began earlier this year and will reach 200 units a month by January. At present the 33502 is not being offered to OEMs, but CDC products have usually been offered to them in the past.

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IBM, ITEL ADD NEW "ATTACHED PROCESSOR" MODELS AS THE PCM VENDOR RANKS GET CROWDED

For four years the computer industry watched in fascination as Gene Amdahl took the plug-compatible mainframe from concept to reality. Now, news of a new PCM CPU manufacturer getting into the business is ho hum stuff, almost. No less than 11 entities are involved in either manufacturing or marketing the ersatz 370/303Xs. Others (at least 3) are skirting the fringes. The latest to get involved are Cambridge Memories, using IPL systems, and Nanodata, a small company of academic birthright that makes a universal emulator. Intel and a little-known, defense-oriented company by the name of Citel also seem ready to make the plunge.

Meanwhile, IBM, the "earth-mother" of all this activity, has been busy, coming out with an "Attached Processor" version of the 3031 that boasts 1.6 to 1.8 times the processor power for as low as 1.3 times the price. While IBM-watchers have become accustomed to the announcement of AP versions of high-end IBM systems -- starting in 1976 with the 168 AP -- EDP/IR makes these observations:

- The 3031-to-3031 AP price/performance ratio is a lot closer to the 158-to-158 AP ratio than the 168-to-168 AP ratio . . . perhaps as a result of competitiveness among IBM alternatives, perhaps simply by the nature of the machines.

- It was four years between the 168 announcement and the announcement of its AP version, only one year between the 3031 and its 3031 AP. And this is the first time an AP has appeared before an MP.

- The MP announced for the 3033 (EDP/IR,April 7,1978) represents little change in price performance (just more capacity for more money) . . . not so with this AP version.

- Although some analysts have suggested that the 3031 AP is inspired by IBM's need to relieve manufacturing pressure from the 3033 and 3032 . . . it's likely that user upgrade needs are more significant.

- The 3032 from which the 3031 AP should siphon upgrade demand is somewhat of an oddball in its position on the IBM product scale . .. IDC forecasts of system population in 1980 see less 3032s than 3033s. This is the reverse of the 158/168 systems.

IBM was not alone, however, in introducing an AP. As if it had a direct pipeline into the IBM locker room, two days before the IBM announcement Itel Corporation announced its AP. For use with the AS/5 -- Itel's 158/3031 competitor -- the new AS/5-3 7031 AP is 1.5 to 1.8 times as fast as its 7031 uniprocessor forerunner. The company also increased the maximum memory from 8 MB to 16 MB.

So, the race -- or melee -- is on. IBM courting its users with new products -- introducing them at a faster rate than before -- and the PCM hopefuls nipping at the Giant's heels.

A closer look at IBM strategy

According to IDC estimates published in EDP/IR (3/15/78), the 3032 is about 3 times the performance of a 3031 at 2 times the cost. Thus a 3031 AP comes close to the middle of the gap between the 3031 and 3032 in performance.

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IBM'S 3031 AP COMPLEX . . .

. . . consists of a 3031 uniprocessor, a 3042 Attached Processor, a 3036 console with dual displays, and two 3017 power units along with appropriate attachment features. Main memory and channel (I/O) functions are provided by the 3031. The 3041 has an instruction execution function and a buffer control function . . . enhancing the total system's ability to handle machine language instructions. Because of the separate power supplies, maintenance of the 3041 can be performed while the 3031 remains operational.

The 3031 AP complex is supported by OS/VS2 MVS or VM 370 operating systems . . . along with the MVS System Extensions used with the System 370 Extended Facility. First customer shipments and field upgrades of 3031 APs will commence in a year. Monthly rental for an AP will run from $41,000 with 2 MB of memory to $57,000 with 6 MB. Purchase price will range from $1.375 million to $1.83 million; a 3041 with the required attachment features costs $375,000. Thus, for large-memory 3031s, an AP represents only a 25% price increase.

ITEL'S AS/5 7031 COMPLEX . . .

. . . rated by the company as 1.5 to 1.8 times the performance of an AS/5-3 7031 uniprocessor, costs $470,000 to purchase. Intial delivery will begin a quarter earlier than IBM. Itel believes that eventually, 25% to 40% of its AS/5-3 7031 base will upgrade to an AP system.

But why a 3031 AP? 3031 users aren't about to switch, having just gotten their systems. The answer may lie with the 3032 and the 158-3's performance relative to the 3031. IDC clocks 158-3 power about equal to the 3031 (with the latter costing less) . . . but the 3032 is a water-cooled system. Thus, topped-out 370/158 users (or 370/158 AP users) may find switching to a 3031 AP a more rewarding solution to their capacity problems.

And just for curiosity's sake, EDP/IR took Itel's 25%-40% estimate of AP penetration of its base and extended it to IDC forecasts for the 3031 . . . and came up with a minimum of 750 7031 APs out there eventually, or almost $300 million worth of 3042s.

The new PCM CPUs

Meanwhile, look at the new PCM CPUs that have come down the pike recently. In no particular order:

Itel has announced the AS/3 Models 3 and 4 as direct replacements for the 138 and 148. To be manufactured by National Semiconductor, the AS/3 is available with 1-4 MB of memory. Model 3 is 1.4-1.8 times as powerful as a 370/138, says Itel, a Model 4 equal to or better than a 148. By virtue of its new 16K memory chips, says the firm, the system requires an average of 50% less space and power than its IBM lookalike. First customer deliveries will be before the end of the year. A 1 MB Model 3 will cost $490,000, a 1 MB Model 4 $600,000. Itel's price of memory per MB: $110,000. The AS/3 joins Itel's AS/4 and 5; and although a 1 MB AS/4 costs in excess of $800,000, Itel says it will still continue to be marketed . . . the Model 3 is aimed at a smaller-system end of the market.

Cambridge Memories, rising after banks called loans in 76, has announced a family of 370 CPUs. Made by IPL Systems, the new CPUs will be based on the

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CDC Omega 480-1 line, also made by IPL. Cambridge says it has yet to establish its pricing, but it promises to offer its systems at 80% of IBM prices, with 10% to 15% better performance. The new system uses emmitter-coupled logic and heavy amounts of microcode. The three new models support up to 768 KB, 1 MB, and 2 MB respectively. First deliveries: mid-1979. Cambridge sees three major markets: (1) the smallest, one-to-one replacements of standalone IBM systems, (2) hierarchical distributed networks, where an IBM-compatible downstream processor would be desirable, and (3) leading-edge minicomputer applications that could use a machine that can run IBM code. An example of the latter: National CSS has opted to buy systems at the high end of Cambridge's line for use in timesharing systems running with NCSS software.

Hitachi has announced what it calls the world's biggest and fastest computer, the M-200H. The Japanese mainframer claims that it will be 70% faster than IBM's 3033, 10% faster than Fujitsu's M-200. The system will support up to 16 MB per processor and be configurable in multiprocessor (up to 4) lash-ups. The system, which will be available in late 1979, will cost ¥36 million and up ($110K) per month, according to IDC's EDP Japan Report. The system also supports an optional array processor than can reportedly quadruple system performance in scientific calculations.

Although Hitachi hasn't said the system will IBM-compatible, it has admitted to IDC's Japanese representative that Itel is planning to develop an AS model based on the 200H. And Hitachi has unofficially introduced a PCM 3850 Mass Storage System for use with the new blockbuster.

Nanodata, which has been delivering its Q1 emulator system since 1974, says it will shortly market a family of computers compatible with IBM 370 software. The Q1 emulator -- devised out of academic requirements for a universal host computer -- can purportedly emulate any computer. Nanodata customers include the military, academia, and the aerospace industry. Since Nanodata already markets superminis, EDP/IR expects the PCM 370 to take a form similar to NCSS/Two Pi's mini-based family. But the system, says Nanodata, will be designed in-house.

Citel, a new company affiliated with California's Instrumentation Technology Systems, has introduced two 138/148 PCM CPUs. Costing from $460,000 and $650,00 up, the two systems are said to be the start of a whole family called the 30XX Series. But the company doesn't expect to market them as direct replacements for IBM computers . . . but in new applications such as back-end processors, front-ends in electronic mail systems, etc.

Mitsubishi has announced that it, joining Hitachi and Fujitsu in Japan, will eventually market PCM IBM computers . . . having budgeted over $100 million for development. Firsts shipments, though, won't be until 1983.

There are other possibilities. Intel Corporation, the microprocessor whiz kid on the semiconductor block, has agreed in principle to acquire MRI Systems Corp., a Dallas-based data base management software vendor. The synergy of Intel's semiconductor prowess and MRI's System 2000 expertise lead many analysts to speculate that Intel may get into the PCM CPU business . . . or at least into the back end with a data base processor.

And there are still other computer vendors capable of supplying PCM CPUs: U.S. mainframers besides CDC; Siemens, ICL, and Philips overseas; Texas Instruments and other semiconductor houses; and the super-minimakers.

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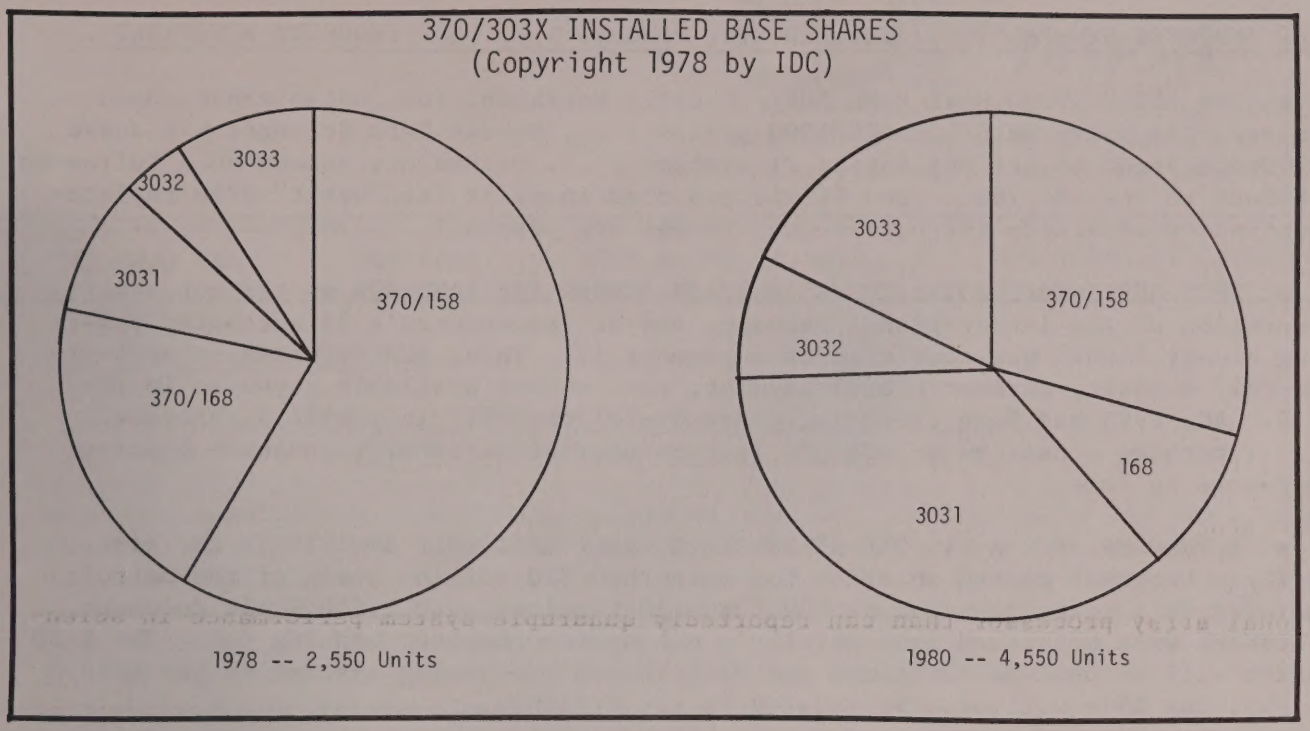

In bed with the Giant

EDP/IR muses . . . what is IBM going to do about all this? At first, perhaps, little. Business is good all around. And PCM computer users won't be as hard to woo back as users that have converted to other mainframer software.

Down the line, though, life could be different for PCMers. Except for National Semi's "reverse-engineered" system, most of the PCM CPU's are "functionally" compatible with IBM systems. This is a phenomenon of the fact that IBM's basic 360/370 software is in the public domain. But more and more of the software required to make the new IBM computers work at top efficiency is chargeable. Thus, as PCMers have to rewrite their own software or microcode to keep up with IBM, amortization of those development costs will decrease price gaps. This appears to be how the PCM window will close.

(By then, of course, the PCMers may have bootstrapped themselves into a customer base which they may try to upgrade along their own lines . . . something like the Nanodata, NCSS, Citel plans. Adding substance to that conjecture is the fact that Amdahl has recently said that it is developing its own software for Amdahl customers.)

And then there are IBM's new systems . . . and pricing changes that will probably be inherent. Oppenheimer Company, a New York brokerage firm, predicts that IBM will slash memory prices down to $35,000 a megabyte (GSD is almost there with the Series/1) and offer new CPUs next year with an elevated price/performance ratio. This would effectively raise the software component of systems . . . and diminish PCM margins.

Meanwhile, though, life for the PCMers should be brisk. In support of a short-term bullish outlook, IDC sees the installed base of PCM CPUs tripling this year to 375 systems . . . and nearly tripling again by yearend 1980, when 20% of the 370/148 base and up will be PCM systems (over 1,000 units).

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• THE DDP VENDORS HAVE BEEN BUSY OF LATE: Raytheon, for instance has added source data entry onto its PTS/1200 system . . . Mohawk Data Sciences has added 3270 emulation to its MDS Series 21 systems . . . Pertec has announced a follow-on product to its CMC 1800. And IBM is expected to offer its "Orbit" 3790 replacement sometime within the next week. Things are poppin.'

• EFTS BUFFS TAKE NOTE: THE ACHs REACH ACROSS THE LAND NOW as the nationwide expansion of the interregional exchange net of the country's 32 automated clearing houses (ACHs) was completed on September 11. Thus, ACH services -- such as payroll deposit, automatic bill payment, etc. -- are available anywhere in the U.S. ACH EFTS has been preceding consumer-related EFTS in public acceptance . . . perhaps a nationwide ACH net is harbinger of nationwide consumer banking networks to come.

• BURROUGHS BAGS A BIG ONE AT BARCLAYS (ALLITERATIVELY SPEAKING): the big British bank has placed an order for more than $10 million worth of the Detroit mainframer's gear. A total of 500 B 80-120 terminals and 1,000 S 451 document encoders will be placed into Barclay's nationwide computer banking net. The B 80 units will be used as terminals and distributed processing systems in the branch banks; the 451s will also be located in the branches.

• THE FIRST COMMERCIAL CRAY COMPUTER HAS BEEN PLACED: United Computing Systems will use the gargantuan electronic brain to anchor its newly-expanded international data center. The Cray-1 will join a complex of CDC 170s and 6000s. According to UCC, the Cray-1 stacks up as the equivalent of five CDC 7600s.

• AS LONG AS WE HAVE BEEN TALKING ABOUT DISKS: Memorex has been awarded a $1.5 million contract from the TVA for a multiyear lease of its 3670 drives and controllers. The total system will be able to store 6.4 billion bytes. And CalComp has decided to throw in that towel . . . its memory division is up for sale. Disk and floppy disks account for about a third of the company's 1978 sales. The move is seen as an attempt to alleviate some of the firm's long term debt . . . and the company's plotter business has been more of a bread winner anyway. Last fiscal year was the first since 1974 that the company showed a profit.

• TINY TELENET SAYS IT WANTS TO BE ADOPTED: the company recently disclosed that it is in the process of holding merger discussions with an undisclosed company, which other sources have said is GTE. Telenet, the nation's first commercial, licensed packet switching common carrier, could certainly use the financial muscle a company like GTE could provide. Telenet's public network contains over 100 nodes, services about as many cites. Its 1978 budget will top $20 million . . . but the company has yet to make a profit.

Recently the company entered the network management business offering to sell its TP-4000 computer network nodes or to help users install their own in-house packet nets with Telenet hardware. But scratching out a living in a market dominated by Ma Bell is even tougher than living in IBM's shadow. To take advantage of the market education currently being supplied by AT&T's promotion of its new Advanced Communications System (ACS), Telenet will need more money. With Telenet, GTE could essentially buy in to the ACS marektplace. GTE is the largest non-Bell telephone compamy.

• INFLATION TAKES ITS TOLL, EVEN AT IBM'S GSD: the maker of Series/1s, S/32s and 34s, has just raised prices a tad. More in support than hardware . . .

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" SEPTEMBER 20, 1978 • VOL.14,NO.6 P.J. McGOVERN, PUBLISHER

Dogfight in DOMSAT skies

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SBS HAS ITS AUTHORIZATION SNATCHED BY THE COURTS AS MARKET DEMAND FOR DOMSAT SERVICES BREWS

In an action that has clouded the future of the Satellite Business Systems troika, the U.S. Circuit Court of Appeals has shredded the FCC's case for approving the controversial network, demanding further investigation into possible antitrust violations. Of the three partners, only IBM has made any comments as of press time -- Comsat General and Aetna Casualty and Surety are awaiting closer scrutiny of the court's decision -- and has characteristically expressed confidence that SBS will be approved as is:

> "We're surprised at the Court's opinion and we're confident that the FCC decision ultimately will prevail."

The court's action is the result of long-standing complaints from would-be SBS competitors; specifically AT&T, Fairchild's American Satellite subsidiary and WU Telegraph Co. Previous to FCC approval, numerous objections filed with the FCC and appellate courts were rejected . . . but persistance has begun to reap results. The advent of an anti-trust investigation (still in progress) by the Justice Department and renewed filings with the Appeals Court -- the first round was rejected because the FCC had yet to make its decision -- has turned the tide. Outward confidence by IBM notwithstanding, final approval of SBS is no sure thing.

By press time, SBS and the FCC had responded by requesting review of the three-judge panel's decision by the full court. SBS has also said that it will appeal the decision if it remains unfavorable after review; and the carrier will ask either the FCC or the court to provide new or interm authorizations to continue work on its system during the appeals process.

Meanwhile, SBS is continuing to sign contracts with equipment suppliers, and is maintaining that this setback will not upset SBS's goal of being operational by early 1981. Nippon Electric Co. (radio frequency terminals), Harris Corp. (high-speed modems), Fujitsu, Ltd. (also modems), and Hughes Aircraft Co. (satellites) have signed, or will sign shortly. And SBS is moving ahead with signing a lease for offices in Reston, VA. These moves express SBS' confidence . . . and in their substantial investment may add a hidden weight to any future deliberative proceedings.

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But the extent of the court's disaffection with the FCC's January '77 approval of the SBS partnership indicates that not only could time-consuming "evidentiary" hearings be needed, but that final approval of the status quo will require some fancy footwork by SBS lawyers. Some bones of contention:

- The FCC's conclusion that evidentiary hearings would not be fruitful "because the domestic satellite private communications field is ... new and rapidly evolving."

  The court held that: "As a general matter, though SBS of course does not have a track record -- which is frequently the case in initial licensing proceedings -- some other satellite communications carriers already do. And the weakness of FCC's conclusion is further illustrated by the inconsistency in its logic. In defining the relevant market, it declined to recognize satellite communication as an appropriate submarket on the premise that communication by satellite is reasonably interchangeable with terrestrail modes."

- The FCC's contention that its expertise was adequate and that hearings would add nothing new.

  The court held that: "We cannot accept such a broad use of agency expertise on the specific facts at issue in this case ... The expertise of a commission usefully serves it in evaluating the evidence, but that expertise can not supply evidence and can not, without findings made upon the critical issues before it, guide a commission to a rational and lawful decision.

- The FCC's failure to investigate fully the possible extent of antitrust violations.

  The court held that: "Conceivably some antitrust violations could be so injurious that no redeeming features would save the application, and FCC obviously did not assume that the anticompetitive implications of the SBS application were this irredeemable. How much less serious, then, did it assume them to be? The record gives us no indication, and we are therefore unable to determine whether the decision on the merits can be affirmed."

- The FCC's conclusion that individual partners (especially IBM) could not have competed successfully alone against AT&T was inconsistant with its earlier ruling on CML Satellite Corp., which IBM had tried unsuccessfully to use as a fulcrum to enter the domsat arena in its first bid.

  The court held that: "FCC in the present order implied that IBM needed Comsat's technical expertise and its experience in operating a satellite system. In CML however, the agency rejected this argument, concluding on the basis of its own experience that IBM could readily obtain the necessary technology and expertise in the open market without the necessity of forming a joint venture with a company already possessing them . . . Moreover, FCC made no finding, and there appears to be no evidence that could support a finding, that if either IBM or Comsat entered alone it would do so with a system substantially different from that contemplated by SBS."

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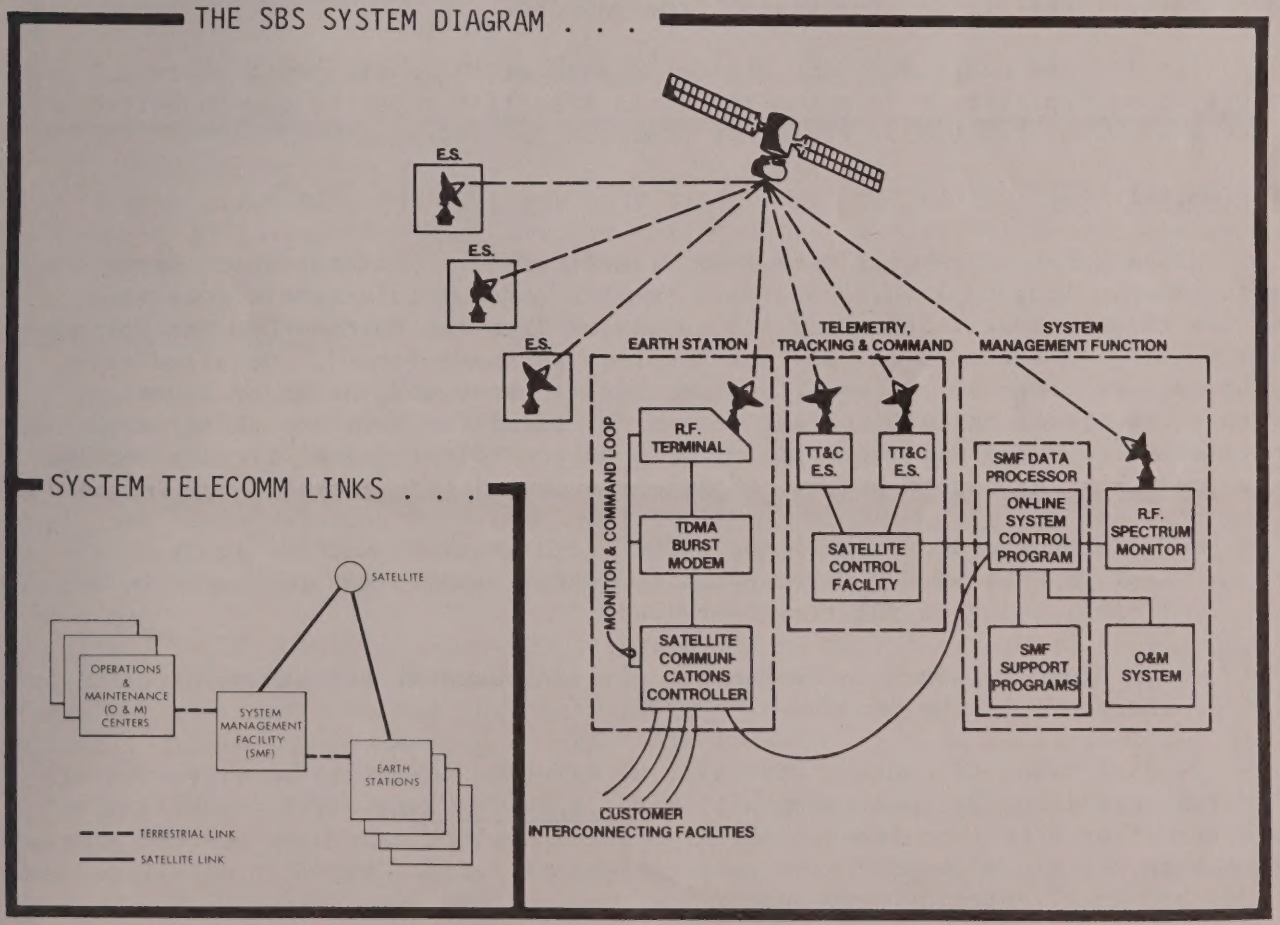
What SBS is all about

The system proposed by SBS will provide users with switched, private line networks for transmission of image, voice, and data traffic in one integrated bit stream. Users will connect to the SBS system through connections at the earth stations, where voice traffic will be changed from analogue signals to digital (nominally at 32 Kbps per voice circuit). Data traffic -- computer I/O and digitized image -- will connect via low, medium, and high-speed ports operating at speeds from 600 bps to 6.3 megabits per second.

At the earth station, the various individual voice, data, and image bit streams will be integrated by the Satellite Communications Controller (SCC) and concentrated by a burst modem for periodic transmission to the satellite at 41 mega-bits per second. Each earth station will have a time slot for transmission and the length of the time slot will vary based on demand. The total capacity allocated to a user's network will be divided among his earth stations by a "demand assignment" stored in each SCC. Thus, the satellite capacity dedicated to a user's net, by virtue of the demand assignment, remains fully utilized regardless of fluctuations in the traffic at individual earth stations. (This concentration also allows SBS to shunt more traffic through the birds and gain more revenues per transponder than in traditional satellite hookups.)

Satellite capacity dedicated to a user's network can be modified at the user's request, normally within 24 hours. For short-term needs in excess of a network's dedicated satellite capacity -- typically in high-speed data transmis-



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sion -- earth stations can call up extra capacity from a special pool provided by SBS for all customers. Use of the pool will be limited to traffic demands in excess of 448 Kbps, about 1% of one transponder's capacity. Authority for earth station access to the pool will be determined by the customer in advance or by a special authorization code. If user pool demand exceeds the transponder's pool capacity, says SBS, it will overflow into a system-wide pool. If it exceeds that, then more satellites are needed. SBS will also offer full transponder capacity to carriers or companies with their own earth stations ... such renting of channels will help soak up and excess system capacity.

The technical aspects of the system give it some unique characteristics, not the least of which are the small antennae size and lack of frequency spectrum contention with earth-based microwave systems ... which answer two of the drawbacks of 4/6 GHz systems. The SBS earth stations, costs of which will be bundled into SBS's service offerings, then, can be located on a customer's premises or close to them. This allows for multipoint networks. Connections between the user's voice and data systems to the earth stations can be via cables for on-site stations. For connection of user sites to remote earth stations, SBS will provide the connection (via microwave, fiberoptics, other carrier, etc.), or customers can provide the connection themselves. SBS may also provide "service between on-net and off net customer locations."

Other benefits of 12/14 GHz transmission come from the fact that the bandwith and orbital spacing are currently less congested than at the lower frequencies (although at least one observer sees the orbital spacing and frequency band width getting heavily congested by the late 1980s). At the moment the major 12/14 GHz transmitters are the television broadcasters.

Finally, as mentioned, the digital aspect of the system will allow for time-division multiplexing -- a method by which satellite capacity can be better utilized than with traditional frequency division multiplexing.

The market

SBS's first users will come from a small coterie of large U.S. companies with immense long-haul voice and data traffic and multiple remote locations. As its target market, SBS chose 415 companies from the Fortune 500 and Fortune 50s listing (800 companies) and set about to estimate demand. Detailed case studies were compiled on 16 of the companies chosen, and, after examination, were extrapolated to total market demand for satellite services among large commercial users. The SBS figures, in terms of equivalent voice circuits and earth stations, are charted on page 6. Note:

- By 1980, SBS sees a call for 3,500 earth stations and the equivalent of over 90,000 voice circuits (these numbers may be skewed by 1+-year delay in SBS first service).

- SBS doesn't expect to commandeer all this demand, estimating a penentration by the mid-80s of 10-20%.

By that time, of course, AT&T will be offering satellite services via its COMSTAR satellite, Western Union will have 12/14 GHz commercial capability as a spin-off of a NASA contract, and the other satellite carriers, RCA and American Satellite, will undoubtedly have competitive offerings. American Satellite already has an all-digital service.

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Still, the SBS demand estimate is quite conservative. Analysts that foresee stardom for SBS are quick to point out that the forecasts don't include:

- Government users
- Smaller companies, such as computer timesharing firms, with big company telecommunications needs
- Consortium users, e.g., AIRINC
- Users operating under the FCC's new resale and sharing policy

In light of these facts, SBS's market share could well exceed its conservative estimates, just as new applications could spur demand beyond that extrapolated from today's users. Dr. William Ginsberg, for instance, writing for the brokerage firm of Shearson Hayden Stone, presents the estimate shown below:

AN ANALYST'S VIEW OF SBS POTENTIAL . . .

	1979	1980	1981	1982	1983	1984	1985	1986
Earth Stations:								
SBS Estimate	78	174	270	366	375	375	375	375
" with 6 mo. delay	30	126	222	318	375	375	375	375
With Improved Technology But Only Two Satellites	30	126	222	318	403	455	497	535
Third Satellite in Orbit					115	258	417	600
Total (Ginsberg Estimate)	30	126	222	318	518	713	914	1135
Revenues/Earth Sta. ($M)*		.2-.6	.3-.6	.4-.8	.4-1	.5-1.1	.6-1.2	.6-1.2
Annualized Op. Rev ($M)		4-69	67-144	127-254	233-518	356-784	503-1097	681-1362

* Based on a forecast of communications expenditures by the top 125 U.S. companies and the expected eligibility of the traffic for satellite transmission of that communication.

Others, too, have foreseen the possibility that SBS will be a billion dollar company by 1986, and note that predictions of 1,000 or more earth stations by 1986 fit well within SBS's conservative estimates of market penetration.

Need for new applications

After its initial 16-company market study, SBS went to another 16 companies in its target market of 415 and performed some specific network analyses. Although SBS is closed-mouthed about the results of these studies, it's been reported that the companies methodology was this: First, current customer data, mail, and voice traffic and executive travel was analyzed; second, projections were made to 1979; finally computer routines were used to determine the savings an SBS service of a particular configuration and traffic penetration could provide.

The "hard" savings, reportedly, turned out to be not so great: Most companies have relatively few routes with enough traffic to support satellite use. Three of the studies showed that only 15-20% of the companies' traffic would be eligible for SBS takeover with savings less than 5% of total communications costs.

Thus SBS will look to new applications to spur demand, and, in fact, the company has admitted that its success may hinge on them. SBS talks of "acting as the catalyst" in generating new applications . . . electronic mail, teleconferencing, and direct channel-to-channel computer communications.

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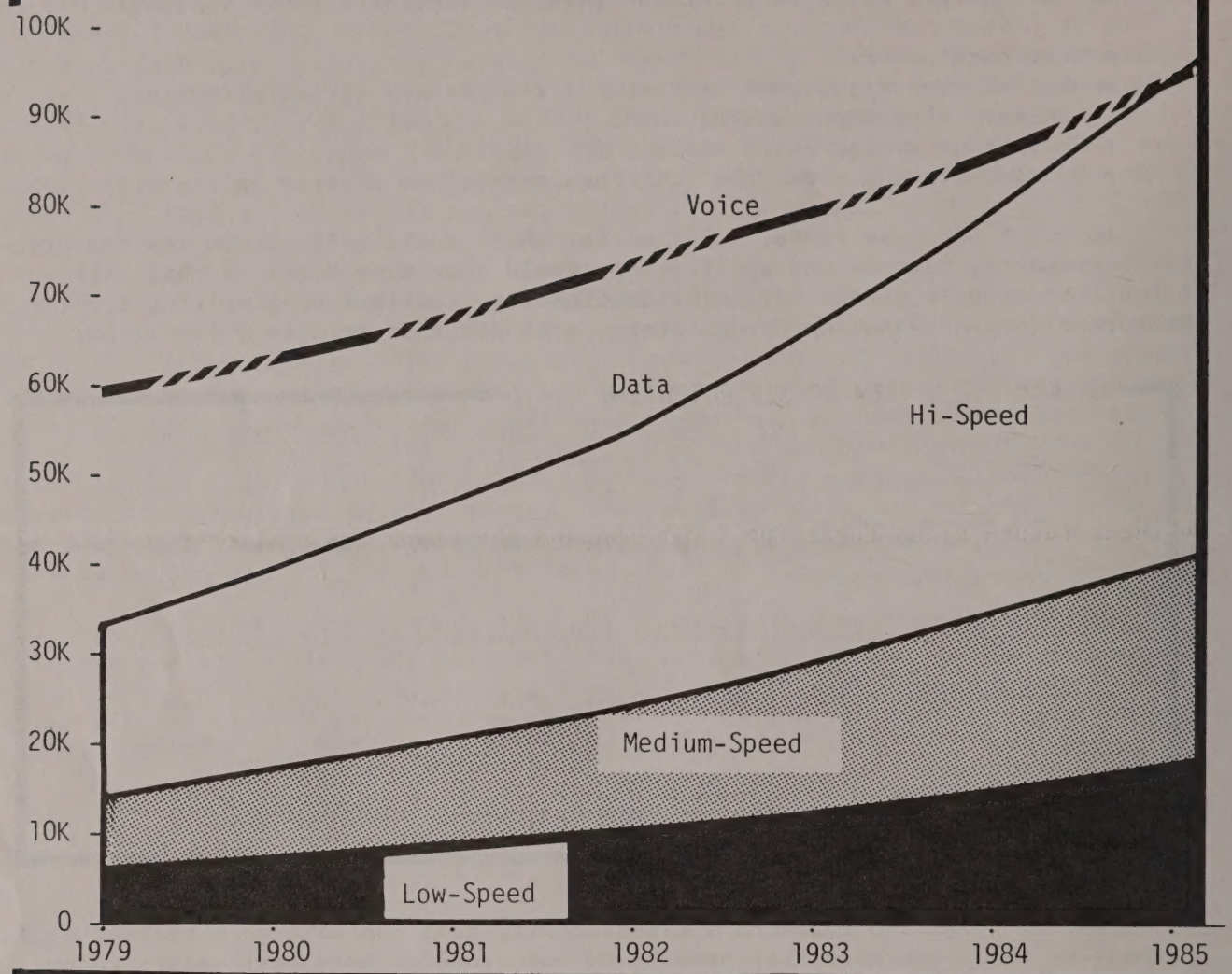
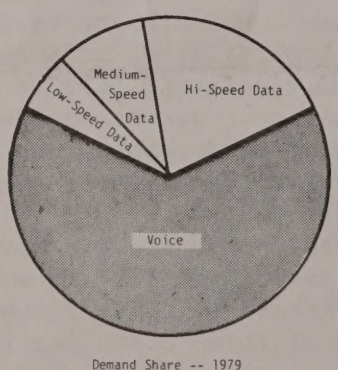
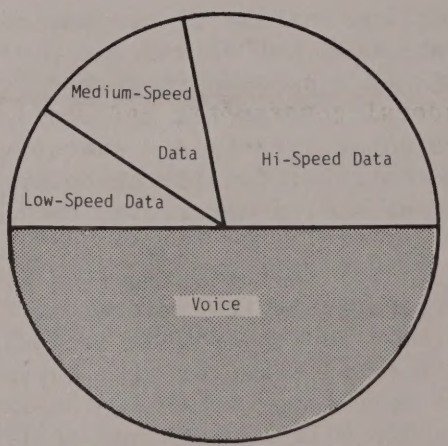
SBS FORECAST: TOTAL SATELLITE DEMAND, VOICE-EQUIVALENT CIRCUITS . . .



SBS FORECAST: SHIFTING DEMAND SHARES -- 1979 TO 1985 . . .



Demand Share -- 1979



Demand Share -- 1985

Source: SBS Estimates

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View from the rival camp

While SBS is suffering the slings and arrows of its particular misfortune regarding its parentage, its competitors won't be standing still. As a matter of fact, they can't afford to. None of the major DOMSAT vendors -- Western Union, RCA Americom, or American Satellite -- has yet made it into the black, in an industry four years old this year. EDP/IR estimates that the satellite revenues of the three were in the $60 million range last year.

In a way, the SBS imbroglio represents the best of all possible worlds for competitors. On the one hand, SBS's marketing efforts -- Project Prelude, e.g. -- and intense press coverage are educating a market to which satellite service is a new and foreign concept. On the other hand, the full force of SBS's marketing efforts will undoubtedly be diluted by the legal uncertainties. And while SBS still represents somewhat of a threat -- or at least a factor to be considered -- by Ma Bell in her network service offerings, the other DOMSAT vendors have room to maneuver. They aren't getting crunched between two giants doing battle.

An example of SBS's user education: in a recent IDC survey of 241 IBM sites on their future plans regarding IBM's SNA and SBS grand designs, over half considered themselves possible SBS users. A fifth had attended a seminar or briefing on SBS, and a full two/thirds of IBM 370/168/165 users were SBS candidates.)

A look at what the SBS competitiors are up to:

- Western Union, the first DOMSAT supplier with its Westar system, is busy publicizing its upcoming upgrade of that system, Westar II. A shared system with NASA, which will use it for tracking lower orbit satellites, Westar II will offer both the 4/6 GHz transmission that today's systems offer . . . and the 12/14 GHs transmission SBS has proposed. The first satellite in the system is expected to be put in orbit in 1980 -- as is (was?) SBS's -- via the Space Shuttle.

- RCA has yet to commit itself to the higher frequencies in whatever second-generation system it proposes . . . and at any rate has yet to saturate its present bird. The company appears to be finding a major niche among broadcasters.

- American Satellite, which leases bulk transponder space from Western Union and resells it, has meanwhile become a true SBS shadow. Having cut its teeth on high-speed data transmission applications for federal government, the company now offers "Satellite Data Exchange (SDX)" service -- an all-digital service running at data rates from 56 Kbps to 1.544 Mbps. The service features customer earth stations (5 or 10 meter dishes), and American Satellite stresses its integrated voice, graphics, and data capabilities. Sperry Univac is the first SDX customer -- testing high speed computer-to-computer applications among others -- Boeing is the second. The SBS influence displays a rich vein in the firm's marketing . . . to the extent that the company will write 3-year leases for users who may wish go to SBS in the future but want satellite service now.

Meanwhile, next year the FCC embargo against AT&T offering private line satellite service will run out, barring an extension of the original deadline; and the third Comstar bird went aloft this July. DOMSAT life is getting interesting.

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• WITHOUT ECLIPSING ITS EARLIER PRODUCTS, DATA GENERAL has added two new systems to its family of Eclipse computers. The first is the Eclipse C/350, a new 1 MB midrange system similar to the older C/330. But besides the larger memory, this system has I/O transfer rates up to 10 MB/second and faster internal processing speeds. "In application-dedicated environments," says Data General, "it can support eight to thirty-two interactive terminals." Larger multifunction systems can handle an interactive load and simultaneously support timeshared program development, multiple batch streams, and teleprocessing. The $100-$200,000 system comes with an optional "Burst Multiplexor Channel" that forms a high-speed pathway between main memory and high-speed peripherals.

The second computer, the S/250, is being billed as Data General's fastest scientific computer. It's targeted at a broad range of real-time, computational, and communications applications . . . and comes with the same main memory and I/O transfer capabilities as the C/350. The $35-$200,000 system comes with various options of interest to scientific users: Floating Point Processor, Integral Array Processor, Burst Multiplexor Channel and Data Control Unit, and User Control Store.

• APPLICATIONS SOFTWARE, INC., HAS CRACKED A TOUGH AT&T NUT . . . by the signing of an agreement with Western Electric, Ma Bell's manufacturing arm, on the terms and conditions under which operating telcos may acquire ASI software products. The products in question -- ASI/Inquiry and ASI-ST -- are data base/data management packages. The latter is a general-purpose data management and reporting system, the former an interactive query language used with IBM's IMS.

• SOME COMPUTER INDUSTRY DROPOUTS OF NOTE: Sperry Univac will finally ditch its Accuscan electronic checkout business after five years of trying to make a go of the old RCA experiment. The company cites a "disappointing level of acceptance by the retailing industry" . . . which may have been prompted by consumer reluctance to go without item pricing. And Control Data has abruptly cancelled its plans to sell its first intelligent terminal, the C-760, which it debuted at this year's NCC. The company had already shipped a few of the OEM versions of the terminal when the decision was made. The company says it canceled the system because it did not apepar to meet market needs and that it plans no immediate replacement . . . to the chagrin of those distributors which had orders in hand.

• WITH INSITE INTO USERS' NEEDS, Applied Data Research has acquired Insyte Corporation's Data Base Management System and Telecommunication Monitor Software Product Line (Datacom). ADR will also get Insyte's Datacom Corporation. With the new product line, ADR gains entry into the up-and-coming data base management field. Cost of the buy: $2.5 million.

• ADDING IMPETUS TO ITS LEVEL/6 MINI, HONEYWELL has announced an agreement with Cincom Systems to market the TOTAL Data Base Management System with all but one of its Level/6 minis. Separately, HIS reports that business for the diminutive computer is booming . . . three times the shipment rate of last year. The suspected reason: development systems sold over the last two years have led to multiple buys. "We won't accept single orders (for current customers) from our salesmen anymore," says a top HIS exec.

• NOT TO BE OUTDONE, SPERRY UNIVAC HAS ENHANCED ITS ESCORT OPERATING SYSTEM for the BC 7 small business computer . . . providing a simplified method of creating forms for data entry and in setting up data files.

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• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

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Word processor market shift seen -- Page 6

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SPEECH RECOGNITION AND RESPONSE UNITS PROLIFERATE AS TECHNOLOGY APPROACHES MATURITY

The man-machine interface has long been a topic of discussion as man increasingly seeks to meld the machine to his convenience rather than contort his methods of operations to those suitable for a machine. As the typewriter keyboard becomes ubiquitous, researchers are tackling the problems of interaction via speech -- both as input and output.

Within the last year speech recognition and voice response systems have been making their way to market—mass markets—at the same time that many companies are still keeping their future products under wraps in development labs. Among the systems to be directed at a diverse spectrum of the population are a voice input unit offered by Heuristics Inc. of Los Altos, Calif., for use with the Apple II small business machine; "Mike," Centigram Corp.'s device often used with Logical Machine Corp.'s "Adam" computer; and Texas Instruments' "Speak & Spell."

EDP/IR predicts that development of speech recognition systems should pick up from its crawling pace of the past few years and start running soon, aided by higher semiconductor densities and denser logic. The experiences with products that are exposed to the general public will also expedite development of the human engineering aspects of speech systems.

Thus, the day is coming when we may see voice-driven terminals that present rough drafts as output. Perhaps dictating skills will become as useful as typing skills. When and if such terminals find their way into offices, there may need to be some deep rethinking about schemes for the "office of the future."

Speech recognition and voice response systems each have their own requirements and sets of restrictions. Recognition systems come in two varieties, those that accept continuous speech, usually with a limited number of words to a sentence, and those that demand a pause around each word. Many of the current systems on the market also require that a user "train" the system with his particular enunciation of words that will be used.

Voice response systems consist of either stored words in memory or synthesized voice, usually created by stringing together phonemes—small elements of speech that distinguish one utterance from another.

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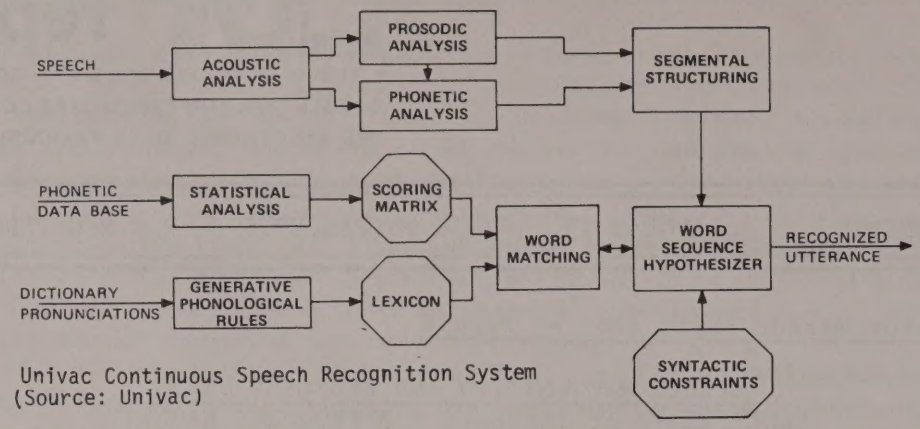
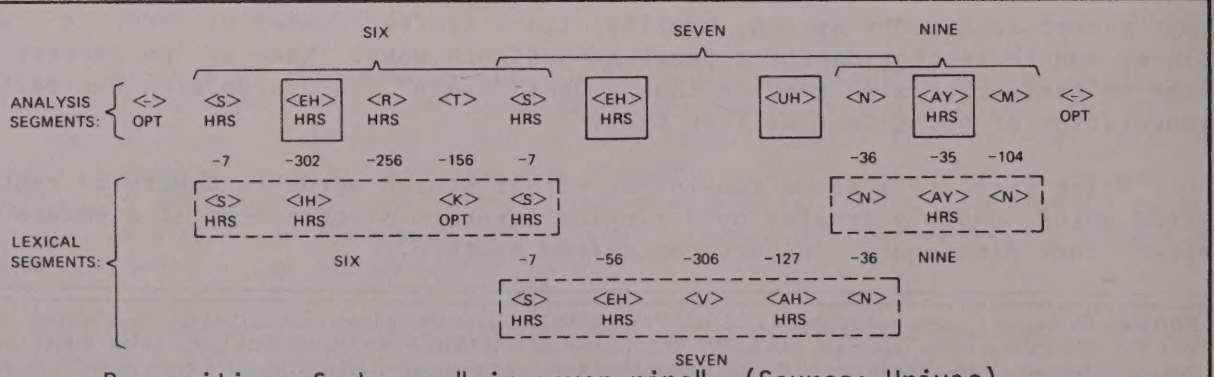


Univac Continuous Speech Recognition System
(Source: Univac)

As can be seen from the two diagrams, the process of enabling a machine to recognize speech can be complex. One goal of the Univac Speech Communications Research Department is development of a "linguistically oriented computer system for recognizing naturally spoken phrases and sentences." The system does not require users to repeatedly train the system with every vocabulary word and accepts continuous speech; it also recognizes speech from several similar talkers without adjustment for individual voice characteristics.

The Univac system under development first digitizes the speech waveform and performs an acoustic analysis via autocorrelation, Fast Fourier Transform and linear prediction processes to produce 14 time functions that describe various aspects of the voice. The prosodic analysis component gives information about the syllabic structure of the utterance. A phonetic analysis component then determines phonetic sequences including "locations and subclassifications of stops, sibilants, nasals, vowels, liquids, glides and fricatives." The phonetic information is represented in a two-dimensional lattice of sound classes versus time, which is then transformed into a non-overlapping sequence of analysis segments, making various segmental adjustments. Finally, a word sequence hypothesizer determines "which sequence of vocabulary words best matches the analysis segments of the unknown utterance." Syntactic constraints direct a word matching component which aligns and scores segments from each word in the lexicon with appropriate analysis segments. The word matcher uses vowels as anchor points and aligns and scores the analysis and lexical segments with the aid of a scoring matrix. The word sequence hypothesizer strings together single word matches and selects as the recognized utterance the best scoring sequence of words that spans all analysis segments and satisfies syntactic constraints, according to a paper by Mark Medress, director of the Univac speech lab.



Recognition of phrase "six seven nine" (Source: Univac)

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At IBM, too

IBM has a continuous speech recognition project underway at the T.J. Watson Research Center in Yorktown Heights, N.Y. Its goal is to convert speech to printed form, but currently it is concentrating on getting the computer to recognize continuous speech without regard to how it is to be implemented. There are no serious efforts being directed to possible products, a spokesman said, emphasizing work is in the research stage. IBM is currently working with two types of languages, both of which require pretraining by the speaker and that the speaker be in a soundproof chamber. In the first instance, the vocabulary is 250 words and the system can cope with sentences seven to nine words long. The accuracy of recognition is 100%, he said, conditional upon the accuracy of the speaker. The output is displayed on a CRT after the system has deduced what was said. While 250 words may sound like a limited vocabulary, 14 million sentences can be constructed from them, IBM said. However, most of these don't make any sense.

The second IBM language project is in preliminary stages and involves a much larger vocabulary. The project took vocabulary extracted from patents of lasers (the words were already in machine-readable form) and from almost 2 million words found 1,000 frequently used words. This system accommodates sentences up to about 30 words, the spokesman said.

Speech recognition units

Most systems require some "training" by which the user pronounces the words that will constitute the systems' vocabularies. Some require that each user repeat these words as many as 10 times in order to train the system; others will operate, perhaps less accurately, after the word is input once. Another distinguishing characteristic among units is the ability to operate in conjunction with telephone lines; many require that the terminal speech unit be in proximity to the user.

Speech recognition systems are used in various environments including:

- Busy hands environments such as baggage handling, mail sorting.
- Programming paper tapes for numerical control machines.
- Production inspection.

Probably nearly every major manufacturer and certainly others such as Ma Bell have extensive ongoing projects on speech recognition in their labs. But the products on the market are relatively few in number. It appears there is much more work to be done on recognition systems before they are widely used than on voice response units. A quick recap of some available products illustrates the current capabilities of speech units.

Threshold Technology Inc.'s Model 600 terminal can serve as a replacement for or as an adjunct to a keyboard. With storage utilization of 1K for 32 words, the unit has a vocabulary size of 64 words, expandable to 500. An optional wireless radio input permits operator mobility. Up to 32 Threshold 600 terminals can be supported by the mini controller Threshold 2000. Although Threshold prefers users to train the system by repeating each word 10 times, the system reportedly operates with 98% accuracy with only a single pronuciation of each word by a speaker prior to use.

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Centigram Corp. offers a small unit on an OEM and end user basis that recognizes up to 16 words or phrases after training. One company, International Management, Inc. has incorporated Centigram's unit into "Tellie," a telephone that accepts verbal instructions such as answering and hanging up and dialing frequently called numbers. Centigram's unit, called "Mike," is also marketed in conjunction with Logical Machine Corp.'s "Adam" small computer. Heuristics, Inc. is selling its 32-word vocabulary, $189 voice input unit for use with the Apple II computer via computer stores.

Interstate Electronics Corp. has an $18,750 intelligent terminal that accepts voice input either directly or via telephone. Its vocabulary is up to 900 words for a single operator station or 250 words for each of four channels. As with other systems, the operators pretrain the system.

Voice response

Voice response systems are frequently found in situations where the response is triggered by digital signals, such as in:

- Air traffic control
- Acknowledgement of orders entered via push-button telephones
- Credit checks

In Japan, Hitachi's Hivors voice response system is used by Japanese National Railways for seat reservations on its bullet train. Another Hivors system enables off track bettors to place bets with the Japan Racing Association using pushbutton phones. Both these systems use prerecorded voice input, but Hivors also has versions using synthesized speech. The available vocabulary for pre-recorded models is up to 2,048 segments and 13,568 segments with synthesized speech. A segment can consist of multiple words such as "the answer is."

Univac has installed a voice response unit, a VRU-400, in a large West German catalogue retailer operation. The caller indicates via pushbutton phone what item he wants and then verifies his input which is verbally repeated to him. In addition, the system gives the customer realtime confirmation of the item ordered, its availability and its current price.

The VRU-400 can handle up to 16 different, simultaneous audio output/push-button input channels and its vocabulary spans 200 seconds of recorded speech digitized and stored in charge coupled devices (CCDs).

Another method of producing speech is via speech synthesis. Votrax, a division of Federal Screw Works in Troy, Mich., converts digital information to speech and the system produces words and phrases by stringing together phonemes, or basic sounds of spoken language. The Votrax VS-6.4 is designed for use in applications where unlimited vocabulary is desired and is used in process industries for alarm systems. The computer not only alerts the operators to changing conditions, but also can instruct them regarding action to take.

Children are being introduced to speech synthesis via Texas Instruments Inc.'s "Speak & Spell." The learning aid employs an MOS/LSI chip for speech synthesis, two 128K ROMs that each can store over 100 seconds of speech, and a special version of the TMS 1000 microcomputer. Words have been digitized and stored in ROM;

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when a word is needed, it is called out of memory and converted into analog impulses that cause an audio speaker to form the sounds that make up each word.

The TI unit employs three chips: a speech synthesizer, ROM and controller. A key element is the use of linear predictive coding, a voice compression technique that can generate speech from data rates of less than 2,400 bit/sec, according to TI.

Speak & Spell pronounces any of 200 commonly misspelled words and indicates via verbal and visual praise that the child has correctly keyed in the word which is displayed on an eight character screen. Wrong answers receive encouragement to try again. The suggested retailed price is $50.

Probably in more cases than not, consumers are unaware they are hearing synthesized speech; many systems are used in conjunction with telephones, such as the Univac order entry system. The State of Illinois uses computer generated speech to help traveling state employes place telephone calls through the least expensive routing. After a caller dials the central state credit card number, a computer verbally tells him to read his credit card number into the phone repeats the number and asks if it is correct. Once the credit card number is correctly entered, the caller reads in the number he is calling. The computer repeats each number as read and the caller makes corrections if necessary. Then the call is routed through the appropriate state telephone line.

Speech response and speech recognition units obviously have vast potential for eliminating the intermediate person currently manning online CRTs at various centers for order entry and other similar operations with limited numbers of steps. But the potential for danger is also there inasmuch as the consuming public already often has trouble with and blames the computer when something gets fouled up. Currently there is a person on the CRT inquiring into files who can often spot incorrect information and/or direct the user as to how to remedy the situation. But without that person linking the consumer and the computer, systems analysts had better be sure the system correctly handles all types of situations. For systems that are inadequate in dealing with consumers can cause untold frustration and distrust, all of which can only deter growth in the industry.

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OTHER METHODS OF CREATING DATA PROMISE HIGH INCREMENTS OF GROWTH

Ah yes, and what about word processing, that much abused, oft-misunderstood concept that despite unclear delineation is wending its way into the guts of organizations both large and small. And there are other techniques, here and coming, which, although not exactly fitting into the format of word processing, do relate to the problem of getting words from one medium to another.

Machine translation of languages appears to have reached a new level of proficiency with the Systran from Latsec, Inc., La Jolla, Calif., which can reportedly turn out working documents without post editing. The system, operating on a 370/ 155, translates about 300,000 words per CPU hour, or one sentence every 1.2 seconds, according to the company . Systran codes attached to individual and compound words during dictionary lookup contain semantic and syntactic information about each word and its interaction potential. This information is examined by a parser in determining the proper analysis of each sentence it translates. The system was used in the Soyuz-Apollo project.

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There are printers and printers, but the field is about to be broadened within a year with a device that has been dubbed "the intelligent copier." Wang Laboratories, Xerox and Toshiba are reportedly preparing these devices. Wang's unit is more appropriately considered as a high speed nonimpact printer, a spokesman said; it handles about 1,200 line/min or 1,000 copies an hour. The device uses a very high resolution CRT, with a matrix of 30x30 as opposed to the common 7x9 dot matrix, so the characters on the 9 in. wide, 1/2 in. high screen appear to be fully formed. The image on the screen is reproduced on the copier bed in a similar fashion as a facsimile machine transforms impulses into images. Wang estimates the machine will be ready for market between March and May, 1979.

Word processing CRTs are in

The greatest gains in market share of word processors during the next five years will be made by the shared logic variety, systems with more than one keyboard dependent on a processor. Starting from a very small base, this type of equipment should overcome user fear that productivity will grind to a halt if the central system goes down. A strong selling point is that the incremental cost per keystation after about four is less than for the standalone variety.

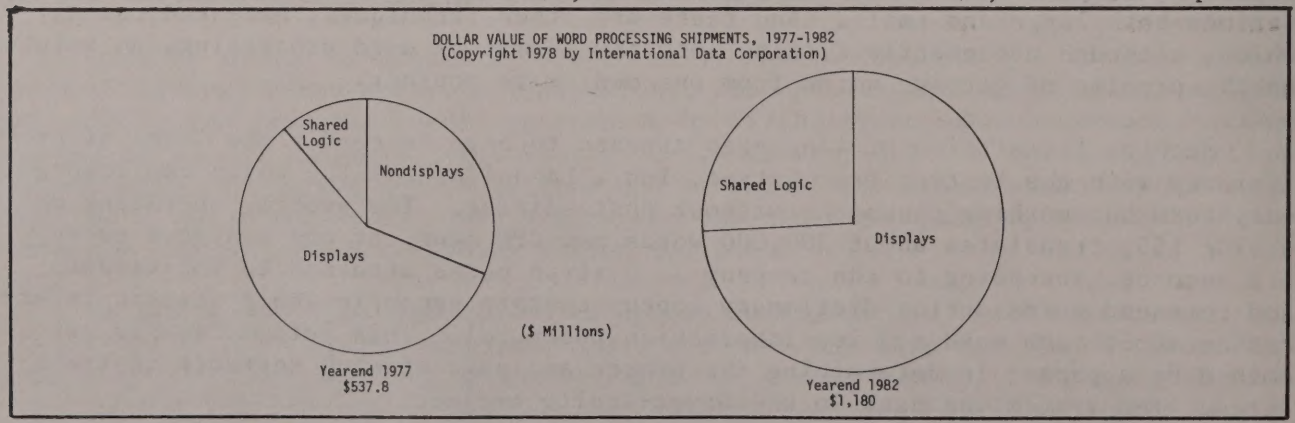
In the standalone segment, the units without a display should virtually disappear as a separate market force, with shipments dwindling rapidly. The standalones with displays will experience about a 50% drop in prices, thus making them cost competitive with the nondisplay versions, according to a report by International Data Corp.

A third segment consists of hybrid systems, those that perform both word processing and DP functions. These are expected to be most in demand among small businesses if the users can perceive that they will fill both needs.

Within three years, the major segments will include the electronic typewriter that includes a single line display, the CRT standalones and shared logic systems that are either solely word processors or hybrid with DP capability.

The word processing market is sliced up unevenly, with IBM holding 74% of the installed worldwide base at the end of 1977 while seven other vendors shared 20% of the base, leaving only 5% of the market split among over 20 other vendors. The seven splitting the 20% share are: Xerox, CPT, Redactron, Savin, Lexitron, Wang and Vydec. IDC did not include IBM's memory typewriter in the WP market.

IBM's clout in the market comes from its predominance in the standalone sector. The 74% translates into $2,325 million out of the $3,229 million pie



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of worldwide installed systems on an if sold basis. In the shared logic arena, worth $108.2 million worldwide, four vendors, Wang, Jacquard, ICS and Daconics hold 61% share of the dollar value.

Increasing numbers of systems will be equipped with communications capabilities, some of which enable the station to act as a terminal to a host computer in addition to swapping texts with other stations. Companies would do well to start planning integrated systems including DP and WP.

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MEMOREX TO FIGHT DIRECTED VERDICT FOR IBM

All is not serene in the fair city of San Francisco as Memorex prepares to mount an appeal in the Ninth Circuit Court of Appeals seeking to overturn Judge Samuel Conti's award of a directed verdict to IBM in the Memorex vs. IBM antitrust case. The jury had split 9-2 in favor of Memorex after 19 days of deliberation. In issuing his verdict, the judge said the case was too complex for a jury and struck Memorex' demand for a jury in the event of a retrial. Memorex has already approached the appeals court on the abrogation of its right to a jury trial.

While the directed verdict may have elicited yawns simply because it left IBM still untarnished in the courtroom, the decision cited several recent additions to antitrust case law. But the momentary skirmish involves Memorex' attempt to have made part of the trial record surveys by it and Conti of jurors' reactions to the case. Although several indicated prior to Conti's ruling they thought the case too complex, many later said they felt they comprehended the issues. Four jurors indicated to Memorex they felt Conti was biased in favor of IBM. And there was evidently confusion over Conti's response to a question about whether they could compromise regarding arriving at a damage figure. The jury decided to award Memorex $127- or $158 million, but abandoned this plan when Conti told them they could not compromise in the method by which they arrive at the figure.

Interestingly, although the final verdict has not been cast in the Greyhound-IBM case, that initial decision was cited by Conti several times, at least once in finding that Memorex failed to prove relevant markets or submarkets. Conti stated: "the primary concern in the submarket context is still whether domination of the product market or markets defined by the plaintiff would enable the defendant to control prices and exclude competition."

"Market share, while being perhaps the most important factor, does not alone determine the presence or absence of monopoly power," so said the Ninth Circuit in Pacific Coast Agricultural Export Ass'n. v. Sunkist Growers, Inc. Conti didn't like Memorex' use of installed base figures to calculate market shares, and would have preferred current output. Citing Greyhound: "The record indicates that IBM's market share is declining. A declining market may reflect an absence of market power, but it does not foreclose a finding of such power."

Predatory pricing is at best a sticky issue. Hanson v. Shell Oil Co., 1976: stated: "the antitrust laws were not intended, and may not be used, to require businesses to price their products at unreasonably high prices . . . so that less efficient competitors can stay in business. The Sherman Act is not a subsidy for inefficiency." From this ruling Conti said there are two tests for predatory pricing: "(1) pricing below marginal or average variable costs and (2) pricing above marginal or average variable costs but below the short run profit-maximizing price where barriers to entry are high."

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• THE 3850 MAY BE FACING SOME COMPETITION, Storage Technology Corp. evidently is probing large users about interest in a 3850 replacement/substitute. Look for a couple of product announcements from STC this fall, the first of which will be in September. The second should be the product STC thinks will help it grab part of the mass storage sector. To promote 3850s, IBM gives users a free first month of installation and charges 50% of its rate for the next three months.

• EXPECT EXXON TO CREATE AN UMBRELLA organization to mind its Ps and Qs -- as in Periphonics and Qwip and Qyx and seven other companies in the information industry in which the oil company has an interest.

• MA BELL IS TURNING IN HER PETTICOATS FOR TRACK SHORTS in preparation for competition. After elevating the importance of marketing within the firm, she has integrated marketing into three departments serving: the commercial market; residence market; and networking, which appears to encompass traffic entering and leaving Bell's public switched net. Ma Bell has told its operating companies to prepare plans of operation (and profitability) and has issued a January 1 date for system-wide reorganization.

• THE SCRAMBLE FOR TECHNOLOGICAL KNOWHOW seems to be the motive behind several cross-licensing and joint venture arrangements between semiconductor firms. Standard Microsystems Corp., Hauppauge, N.Y., added none other than Western Electric Co. to its roster of semi patent licensees, including IBM, TI and American Microsystems. But Western Union is not only cross licensing its patents and patent applications, but paying Standard Microsystems a sum that should "substantially benefit Standard's second quarter earnings." . . . Fairchild Camera & Instrument Corp. and General Electric Co. Ltd. of England have agreed in principle to produce semis in the UK on a joint venture basis. Another British venture is facing some rough waters in the form of accusations by Mostek that the new venture, Inmos, supported by the U.K. government, misappropriated trade secrets. . . . Another nation eager to get ICs is China, which reportedly has signed Toshiba Corp. and Hitachi Ltd. to a $58 million contract to set up an assembly plant. That deal needs Cocom approval. . . . And the Japanese are moving to the U.S. -- with the likely goal being eventual fabrication of chips here; currently Hitachi, NEC and Fujitsu market finished goods. Hitachi is setting up a plant near Dallas that should be assembling devices by spring. NEC is acquiring Electronic Arrays.

• LOADING PROMS AND RAMS DIRECTLY FROM CPU is one of the handier applications of IBM's 7406 device coupler. IBM is using the 7406 to expedite development in several areas including display devices, analysis of speech patterns, ink jet printer characters, process control instrumentation, and evaluation of a microprocessor-driven bubble memory tester. The 7406 is said to be a computer independent, language independent device that permits the hookup to computers of most analytical instruments as well as other devices such as numerically controlled machine tools and temperature sensors.

• GOING EAST AND WEST, U.S. based service firms extend their tentacles: Tymnet, Control Data's Call/370 and Telenet now serve Hong Kong; a Tymshare affiliate is providing service in Tokyo. And the nets are elsewhere: Telenet also has service in Austria Italy and Canada -- and recently added an interface for PDP 11s.

• INDIVIDUALS' BANK BALANCES WERE IN THE AIR, transmitted via satellite in a demonstration by Stillwater, Okla.'s First National Bank & Trust Co. of an EFTS.

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POS market to grow 20%/year -- Page 5

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EDP/IR SURVEY DISCLOSES EARLY CHANNEL DIRECTOR PROBLEMS FOR 3033 BUT FAST CORRECTIVE ACTION BY IBM AS VOLUME SHIPMENTS START

"That channel director is sure an interesting box. Too bad it doesn't work." -- User of an early 3033

Oops! IBM apparently shipped its early 3033s a little too soon with too little checkout of its channel directors and is frantically retrofitting them in the field. What's more, many users surveyed by EDP/IR say the 3033's performance meets IBM's promises . . . and may even be causing a new "problem" in that the fast CPU appears to cause clogging in the input/output channels. Users must be careful to avoid loading the channels to more than the 30% to 40% utilization they say IBM recommends. However, users with MVS/SE (the performance improver accomplished via software) or string switching may be less aware of this problem.

The first 15 or so early users endured the channel director problem -and some are still experiencing difficulties -- until the IBM customer engineers figured out how to cure the problem, which apparently stems from the timing of the channel directors. A director controls a group of channels, six or four, and provides common logic and control function. Now, IBM is delivering systems that have had engineering changes made at the plant and the new CPUs appear to function quite well, thank you, as IBM prepares for volume deliveries during the latter part of 1978.

The Giant has received high marks from some of these same users for its rapid installation pace. Teams work in 12-hour shifts and had some sites up and running within a weekend. IBM won't say much about the director problems (partly because it is in the midst of reorganizing its computer production -- see Page 4). Here's a rundown on EDP/IR's conversations with early 3033 users.

A defense contractor in Florida whose machine sports a very low serial number apparently was where IBM developed the engineering change for the director, which at this site displayed problems only when the machine was fully loaded. The company had problems with the machine over a period of six weeks although it was evident right away the problem was in the director. However, despite the difficulties, the company didn't lose much time because the system could be brought back up quickly and was so much faster than the 8M, 168 attached processor system it replaced, according to the business manager. Most of the 3033's

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work load consists of scientific number crunching. The channel utilization is "near the IBM recommended limit of 30% to 40%" with its string of 3350s and there have been no problems here.

Another early user of a 3033 also had a problem with the channel director that caused the machine to fail, but IBM fixed it in about 18 hours. The problem showed up shortly after IBM turned the machine over to the company. After IBM retimed the channel director, the system has been running with "good uptime" and there have been no further problems from that sector, said the DP director. IBM plans to make an engineering change at some point, he said.

This user estimates his 4M, 12 channel 3033 is running about eight times faster than a previous 2M 155. The new system has about 80 terminals emulating 3270s under IMS and another dozen under TSO. It does not yet have MVS/SE, however, the string switching feature on the 3330s helps keep the channels balanced, he said. Despite the initial problems, the user promptly started in with production runs of its straight business, manufacturing mix, most of which is in Cobol.

General Dynamics in Fort Worth wasn't superstitious as it took machine number 13. A spokesman was quite closed mouth about the 8M, 12 channel machine that was installed the first of July as a replacement for a 168. He admitted there have been a few problems with the channel director and was eager to see a report on the problem. Results on the General Dynamics system have not been conclusive yet as it is still being cut over, he said. The firm is getting another 3033 that will be in addition to a 168MP. He expects twice the throughput of a 168.

At Singer-Kearfott in New Jersey, Tom Bell, director of EDP systems and technology, said the CPU performance is about what was projected, and the MVS/SE is a little better than projected. Bell said he is having channel director problems and is collecting data on various aspects of being a user of an early 3033. The Singer installation in mid May was a complex one because the firm changed just about everything when it brought in the 3033, including operating systems -- MVT to MVS -- its international communications system, and disks -- it now has 3350s -- so there were "a multitude of physical changes. It's easy to take a negative attitude, but I'm surprised it turned out as well as it did . . . we haven't missed a closing, and there would have been problems even going from a 165 to a 168," he said. Singer's 4M system was the only one EDP/IR found with 16 channels and thus three directors. It replaced a 165 and 168, each with 3M.

Avco's California plant took machine number 34 in late May and most of the engineering changes were made prior to delivery, according to Brad Brackman, operations manager. However, IBM spent an additional four or six hours changing 10 power cards and other items in order to remedy the problem, he said, noting this was considerably less time than the 48 hours IBM had originally requested for the work. "Generally the machine's installation has been pretty clean compared with what I expected," he observed. The 6M, 12 channel 3033 replaces a 6M 158MP.

Brackman has not fully loaded the CPU, but instead runs an average of 30% to 40% utilization. Even so, the channel usage is well above that recommended by IBM and is generally around 40% to 50%, sometimes spiking to 90%, he said. Anything above 30% can lead to problems, he commented. To alleviate the problem, which he said stems from the fact the CPU is so fast compared with the I/O gear, he installed a channel rotation unit obtained through an IBM user group. The disks are 3350s and STC 8350s and the system runs under MVS. The other alternatives are to pay money for program products such as MVS/SE or get more channels. "There

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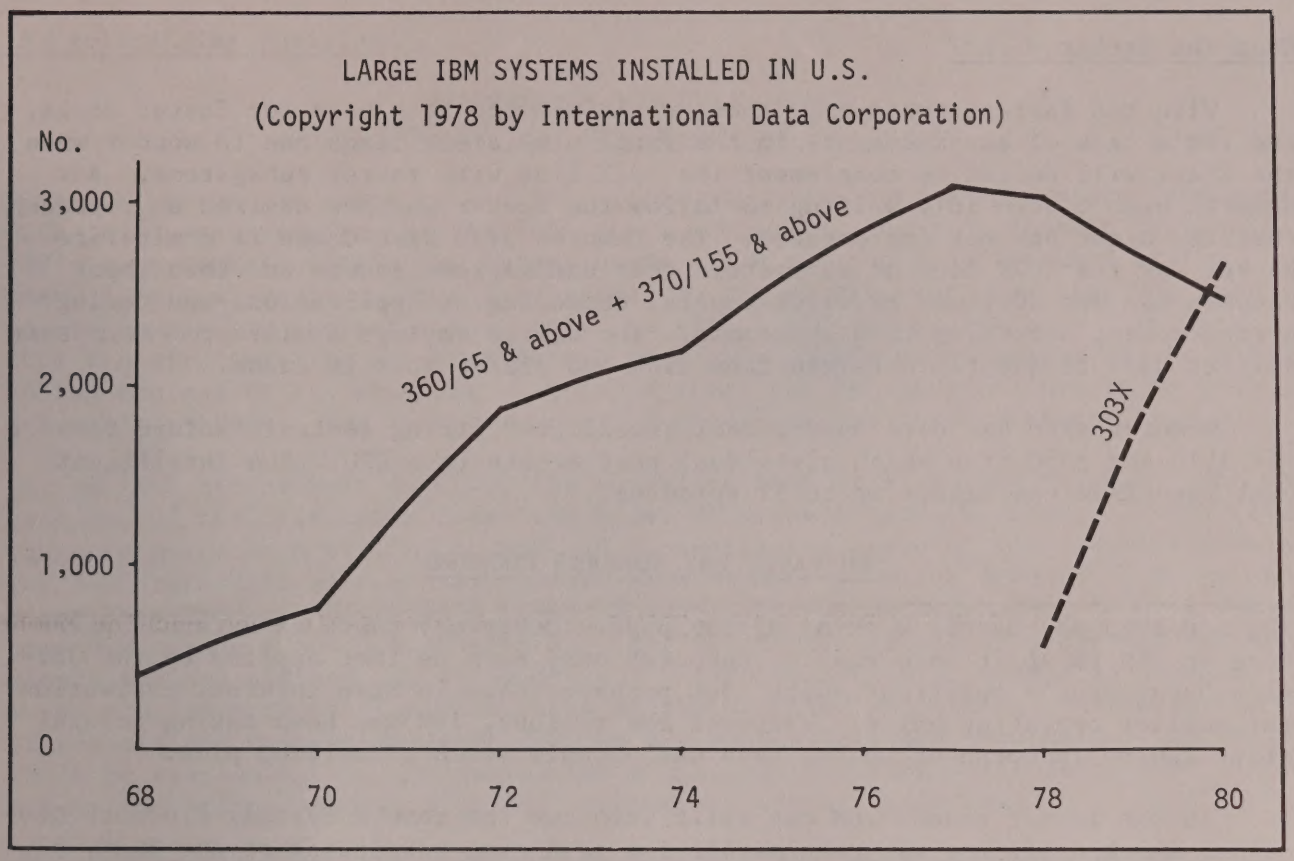

are lots of tools to gain control of the system that aren't available without the Systems Extension or other program products," he observed.

Machine number 44 went to Rensselaer Polytechnic Institute in Troy, N.Y., in mid July. James Moss, director of computer services, reported a very smooth installation of a system so reliable that its predecessor 360/67 was used for parallel operations for only two days. It was then put on ice for a couple of weeks and has been shipped out. Moss had heard of problems with the channel directors but said his machine had an engineering change installed prior to shipment. The 4M machine is in the range of 10 to 12 times faster than the 1.5M 67. RPI skipped the 370 generation entirely, and will probably skip VM operating systems. Instead it uses the Michigan Terminal System software that now supports 75 terminals and eventually should handle the 400 RPI expects to have on it within the next three years. Moss is keeping "a running eyeball" of the system via the system activity console in attempts to balance the channels, whose load is heavy by 67 standards but light for a 33 -- in the range of 10% to 20% utilization, he said. RPI has two strings of 3330s but will be installing four spindles of 3350s.

Problems not unexpected

Many of the users were philosophical about their temporary dilemmas; they had expected to have some problems with early versions of a new machine. And some said that despite the problems they thought things went more smoothly than they recalled may have been the case with initial installations of large 370s. To be sure, there have been some minor miscellaneous problems cited, but these appear to have been caused by bad cards rather than by a design problem, as apparently was the case with the channel director. The topic of being a user of early 3033s will be discussed at the Share meeting later this month.

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Need for faster disks?

With the faster processors, there would seem to be a need for faster disks. And IBM's lack of announcements in the large disk arena leads one to wonder when the Giant will decide to complement its 303X line with faster subsystems. But Memorex hasn't been idly waiting to follow the leader and has devised an approach that the Giant has not implemented. The Memorex 3770 Disc Cache is a mid-life kicker for its 367X line of subsystems that can improve access and throughput between two and 30 times previous levels, depending on applications and paging arrangements, according to a spokesman. The device employs a microprocessor that selects data frequently obtained from disk and places this in cache.

Memorex also has developed a dual intelligent string control feature for its 3670 and 3650 line which gives dual port access to a CPU. The Intelligent Dual Interface can handle up to 32 spindles.

\+ + + + +

IBM PAVES WAY TOWARDS CLONING

The monolith may become a thing of the past. Certainly there is external pressure on IBM to split into smaller corporations, such as that applied by the Justice Department's antitrust suit. But perhaps there is also internal motivation for smaller operating units. Whatever the reasons, IBM has been taking several steps toward independent units, each undoubtedly worth $3 billion plus.

In the latest round, IBM has split into two the former Systems Products Division, which until now was responsible for producing mainframes of the 303X, 370 and 360 ilk. Now it appears there could be three units in the CPU arena, and that doesn't count whatever is happening in the Systems Communications and Office Products divisions.

Large, high performance systems, e.g. all 303X, are the province of the Data Systems Division, which has facilities in Poughkeepsie, East Fishkill, Brooklyn and Kingston, N.Y.

The Systems Products Divison is in charge of medium size systems. The 138 and 148 are in limited new production, so it looks like the E Series is imminent. SPD has facilities in Endicott, N.Y., and development in France and Germany.

Chairman Frank T. Cary explained the move "will provide additional management focus on marketplace requirements in an environment of changing technology, increasing competition and rapid growth." EDP/IR suspects the moves signal:

- A possible change in the pricing structure. There will be a smaller base over which to spread development costs if indeed each division is responsible for these costs.

- The approaching advent of the E series. With DSD putting out the 3033 and GSD busy with its Series 1 and 34, it looks like we can expect the E from the not-to-be-left-out SPD.

The shuffling of top people leaves General Systems Division in the almost unique position of not having a new chief. John E. Bertram is now president of DSD; Jack D. Kuenler is president of SPD; and John Young recently took over the top slot at Office Products Division. Former president of SPD Theodore C. Papes Jr. is now vice-president for business plans at corporate headquarters.

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SUPERMARKET POS UNIT GROWTH TO OUTPACE THAT OF COLLECTIVE POS FIELD

Power to the people seems to be IBM's latest approach to the supermarket industry. With its newest versions of the 3651 store controller and programmable terminals, IBM's supermarket offering no longer needs a 370 and can be programmed by the user. The new version should thus appeal to the single store operator who had no inclination to support a POS operation with a 370 and a 3704 or 5. The new 3651 can also serve as in-store backup to a 370. Scanning equipment may be added to the controller and existing scanning systems can be upgraded on-site to programmable systems. New terminals must be used with the latest controller.

A look at the gear leads to the suspicion that it is fairly capable. The new versions of the 3651 controller, the Model 25 with 76K and the Model 75 with 124K, range in price from $19,000 to $58,340, spanning the range of the previous models. The 3663 terminals also contain their share of memory, which appears to be priced below Data Products Division's (DPD) 11 cent/byte and perhaps above General Systems Division's (GSD) 5.8 cent/byte. The 3663 Models 1P and 3P programmable terminals feature 48K and 32K at $6,450 and $2,980 respectivly. IBM also unveiled three program products for such tasks as checkout and accounting, customization of reports and writing programs for the new controllers and terminals. The units won't be available from the System Communications Division until June, 1979. IBM has tried various appoaches to the supermarket arena, including:

- Full blown scanning system that needed a 370; purchase only; 10/73.
- Key entry system that could operate independently of 370 after initial program loading. This targeted the lower ticket market; 5/75. By substituting controllers, the key entry unit could be converted to accommodate scanning.
- 3663 Model 3 control segment could handle up to three key entry checkstations, representing a lower cost system.
- Programmable controllers and terminals free the system from a 370, thus opening up the single store market to IBM.

SUPERMARKET POS TERMINALS

U.S. Installed Base as of December, 1977

Vendor	# Terminals Installed	% Market Share
NCR	37,000	59.7 %
National Semi	15,500	25.0
Sweda	3,750	6.0
Bunker Ramo	3,000	4.8
IBM	2,200	3.5
Others*	550	1.0
TOTAL	62,000	100.0 %

*Others include Univac, MSI

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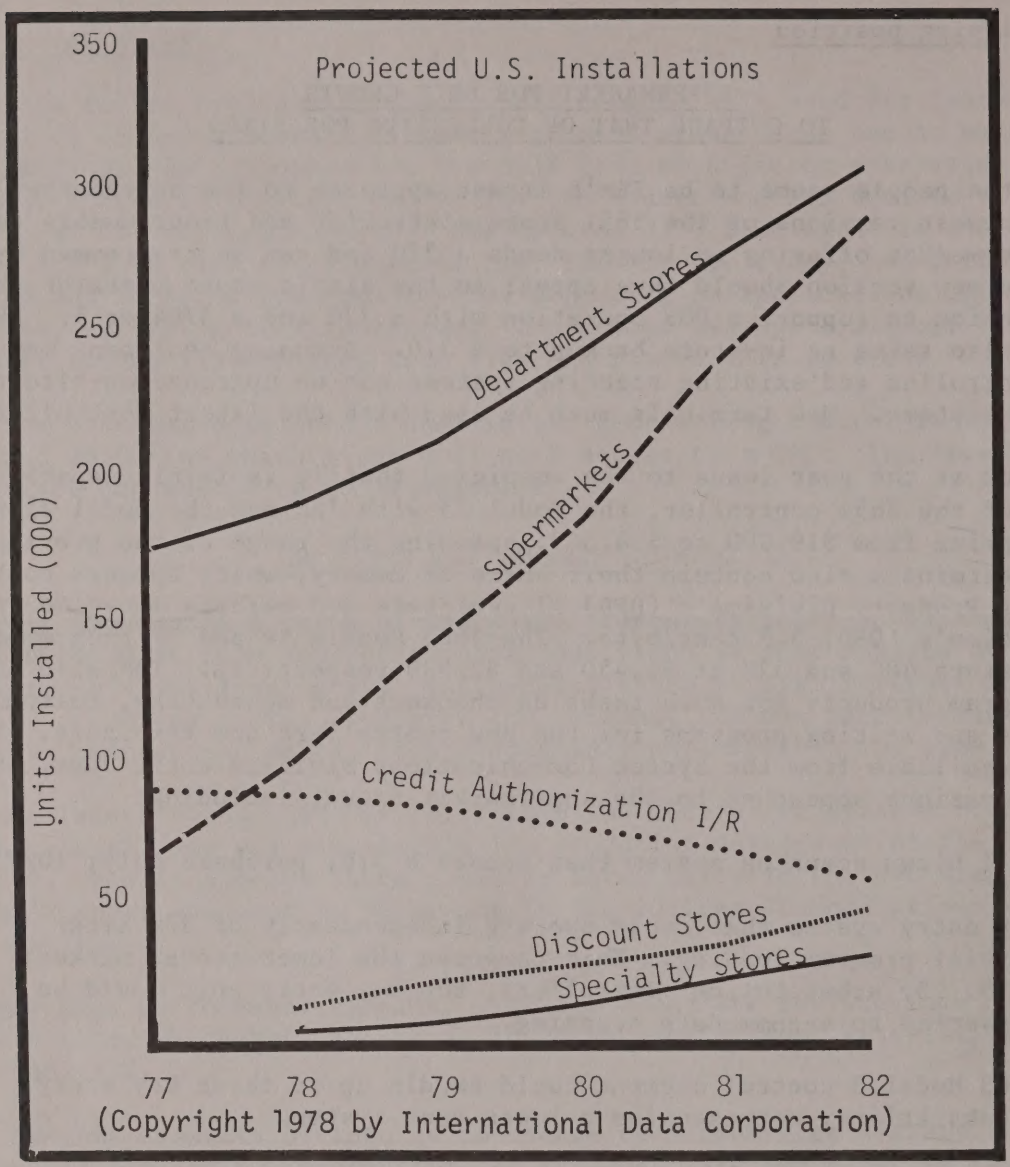

Supermarket POS headed for growth

Supermarket point of sale systems should continue to outpace the growth rate of general merchandise terminals as they did in 1977, according to a report by International Data Corp. Supermarket POS installations grew 59% in 1977 compared with 1976 and 51% in dollar value to $210.8 million at year end 1977, according to the IDC study on application unique terminals. The growth in the supermarkets base should level off at a sparkling 36% annual rate through 1982. Although store managers learned the hard way that customers won't accept the absence of human-readable labels, the number of scanning units should double during 1978 and again in 1979. Earlier this year only 220 supermarkets had scanning equipment installed. Shipments of units, including electronic cash registers (ECRs) that can be upgraded to accommodate scanning equipment (such as Data Terminal Systems' 510), should be in the neighborhood of 44,000 units during 1978, growing to 61,000 during 1981. NCR holds the lead in the market with its Model 225, but industry watchers are expecting a version of the 2140 aimed at the supermarkets. Neither Bunker Ramo nor MSI Data is currently marketing systems to this arena.

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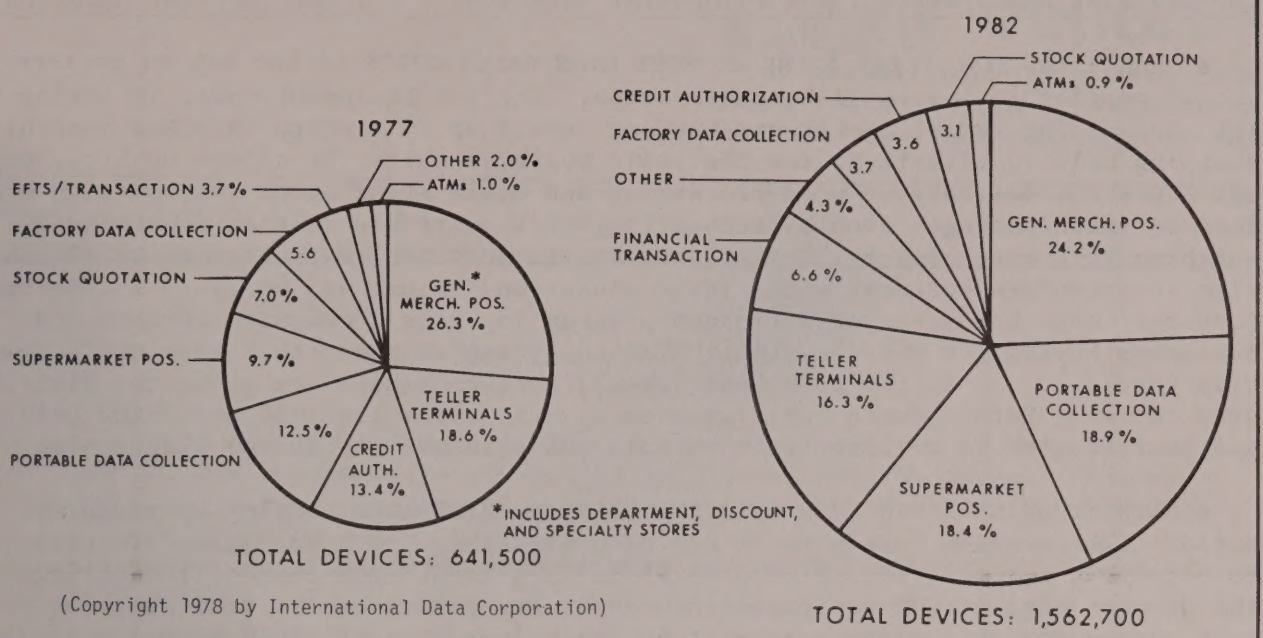

U.S. MARKET SEGMENTATION, APPLICATION-UNIQUE TERMINALS
Number of Devices in Use, 1977-1982

1977 Strong for POS area

Collectively, the various POS markets grew 23% in dollar value over 1976 and 20% in number of units installed. IDC projects an annual growth of 20% per year on the POS base through 1982 for the POS arena. By year end 1977, there were 316,800 POS devices installed in the U.S. compared with 262,000 in 1976. The report, which omitted fast food/restaurant POS, counted 168,000 general merchandise terminals, 62,000 supermarket terminals and 86,000 credit authorization inquiry/response terminals.

In department stores, the largest market sector by far, the forecast growth rate is 12% per year, reflecting the trend to implement POS on a store by store basis rather than the initial rush by nationwide chains such as Sears to equip large numbers of stores with POS overnight.

As might be expected, the growth rates are higher in some of the younger markets such as discount and specialty stores, which IDC is now tracking separately from the department store sector. The installed base of units in discount stores should more than treble from its anticipated 12/78 base of 31,600 units, while the specialty store arena, such as tire stores, should see its base grow just about ten-fold from 3,000 units in 1978 to 1982.

The emergence of these and other markets has been helped extensively by the now ubiquitous microprocessor as vendors seek to put them into terminals expecially designed for a particular application. However, the question of whether the late '70s and early '80s will prove to be the heyday of such terminals, which might later be hedged out by general purpose terminals, or those that can be used for other purposes as well, has yet to be determined. Just as the microprocessor is responsible for the growth of the application unique terminal, could it also later prove to be the reason for stunted growth, as markets turn toward terminals with more versatility?

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• MARKETING LOW TICKET ITEMS WITHOUT HIGH SALES COSTS is the key to preserving profit margins in the small business arena. Digital Equipment Corp. is trying its hand at the retail market and has set itself up in a store in a New Hampshire shopping mall in efforts to tap the small business mart. It offers no kits, but off the shelf delivery on word processing and small stand alone systems with standard software packages such as accounting, etc. Bets are on that others are watching this move closely. . . . Texas Instruments has restructured its discount plan to encourage business with system houses and volume end users. . . . Pertec Computer Corp. has arranged a finance program for retail computer centers and customers buying its micro systems. The money man is none other than CDC's Commercial Credit. . . . At the components level, more companies are going the distributor route -- Dataproducts has signed on Wyle to carry its T-80 and M-200 printers and Lear Siegler is selling its terminals and printers via Cramer Electronics.

• NCR'S MAKING A BIG PUSH INTO THE MICROGRAPHICS AREA, buying up products and/or company whose products it has been marketing. NCR has agreed in principle to acquire Quantor Corp. for about $7.5 million cash. NCR currently distributes the Quantor line of COM equipment in several areas outside the U.S. This agreement supercedes an earlier agreement by which Agfa Gevaert would become European distributor except in Spain. In another move, NCR has purchased from Lundy Electronics & Systems, Inc. for $3.5 million the manufacturing rights to Lundy's document Reader-Sorters used by banks. Currently Lundy supplies these to NCR on an OEM basis. Lundy will continue to supply units to end users and other OEMs.

• CDC AND SCAN-DATA ARE SWAPPING STRONG POINTS IN OCR. Under a finalized agreement, Scan-Data will handle U.S. marketing for CDC's OCR products and CDC will lend some manufacturing and service support for Scan-Data's Positran fast food order entry and operations control system. Scan-Data has rearranged its financing and CDC bought 5,000 shares of Scan-Data preferred stock.

• XEROX-IBM SETTLEMENT WIPES SLATE CLEAN. Gone are all the dozen or so lawsuits between them involving patents for office copiers and word processors. IBM agreed to pay Xerox $25 million, but each company gets a license to use without royalty all the other's patents and all patents applied for in the next five years. That leaves IBM litigation somewhat freer to concentrate on antitrust.

• SATELLITE BUSINESS SYSTEMS (SBS) HAS ANOTHER WISH LIST and is soliciting manufacturers for information on equipment that will complement its forthcoming (1981) satellite communications system. SBS wants: I/O controller operating in the range of 56K- to 6.3M bit/sec; batch document distribution gear for high-speed (30- to 60 page/min) facsimile trnasmission at speeds up 1.5M bit/sec; and teleconferencing goodies including video, audio and image subsystems.

• DATA GENERAL CONTINUES TREND TOWARD COMMERCIAL software and is offering Advanced Operating System (AOS) users the same capabilities as were available on RDOS, including Cobol and RPG II, an interactive applications development tool and the Infos file management system. These will be available on the Eclipse M600 and C/330. DG sees software as the stepping stone that will bridge the gap between minis and mainframes. . . . On the hardware side of the house, DG unveiled the DCU/200 programmable communications controller that off-loads character I/O processing from a Nova or Eclipse host; the price tag is $3,900.

• AS COMPUTERS BECOME OMNIPRESENT, Sears offers antistatic carpeting.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" July 31, 1978 • VOL.14,NO.3 P.J.McGOVERN,PUBLISHER

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MA BELL'S ACS DISPLAYS LARGER VIEW OF COMMUNICATIONS ROLE

As the ancient and struggling U.S. Postal Service threatened to drop its mailbags and head out for a summertime strike, Ma Bell presented the Federal Communications Commission with a scheme that ultimately could relieve the USPS of much of its burden. As outlined, Bell's Advanced Communications Service (ACS) will have extensive store and forwarding as well as editing capabilities and will operate in either point to point or broadcast modes, and thus may become a giant electronic mail system.

ACS will combine several functions under the guise of communications and offer services that Bell says have not been available. If ACS flies, which it probably will after a certain amount of flap, it could render extinct many of the head-scratching problems facing DP and communications managers today. Most likely the effects will be felt by the general population as well.

But Ma Bell is not the only player in town and observors see a head-to head conflict looming with IBM's Satellite Business System (SBS) in several areas. Already, IBM is showing less reluctance to protest in person about some of AT&T's shenanigans -- witness its squawk regarding AT&T's PBXs. EDP/IR expects the contention between IBM and AT&T will intensify if and when the Computer Inquiry II focuses on the issue of defining the functional provinces of communications and computers -- an issue it has deferred until fall.

Bell outlined four major features in its ACS proposal, which it presented to the FCC in the form of a request for declaratory ruling to utilize existing Bell digital facilities -- as well as analog facilities:

- Compatibility between different types of terminals and computers;
- Flexibility to utilize new terminals without conversion and to separate network function control from operation of application programs.
- Customer control of passwords, system design and access while ACS handles network management and generates reports.
- Low entry threshold to enable users to ease into extensive network use.

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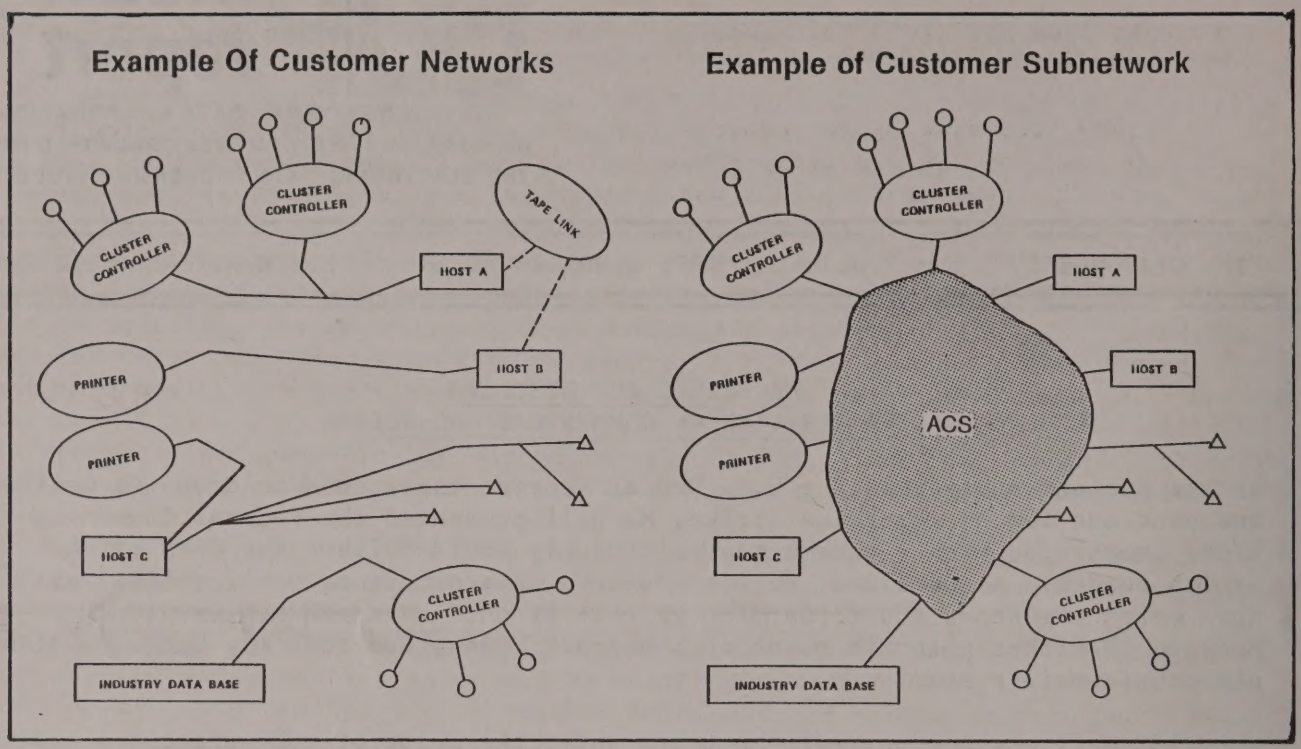

A comparison of Bell's ACS with an existing network structure shows some of the differences. Undoubtedly, a large selling point is that ACS assumes all of the network management overhead. But at the same time, users have yet to demonstrate that they have faith in Bell to do anything more than data transmission. One thing is certain: if ACS becomes a reality, life will be different for communications managers subscribing to the service, for many of their headaches will then belong to Bell.

Impact on others?

The impact on others in the industry is not so clearcut. Nearly all mainframe vendors have spent considerable time and effort designing their own network architectures in hopes that the added lure of communications networking will help sell their computers (and create a "loyal" base).

ACS could serve to open wide the doors that mainframers previously thought they had tightly shut around their installed bases. By facilitating communication from one brand of CPU to another, ACS could have an effect similar to that expected from the prospective I/O channel level interface standard that would permit attachment of one vendor's peripherals to another vendor's CPU. Both moves would eliminate vendor-imposed requirements to utilize that vendor's CPUs or peripherals. ACS might prompt vendors to concentrate on other features such as efficient use of memory or ease of use.

Users should be beneficiaries: vendors can concentrate on their tried and true stomping grounds and ACS rates, by virtue of economies of scale, should be less than those of a vendor-oriented net.

Similarly, the market for independent terminals should also bloom, prompting vendors to add more of the features at lower costs for which independents are famous. But also, with intelligence available from ACS, there should be a resurgent growth in "dumb" terminals. As their prices continue to drop,

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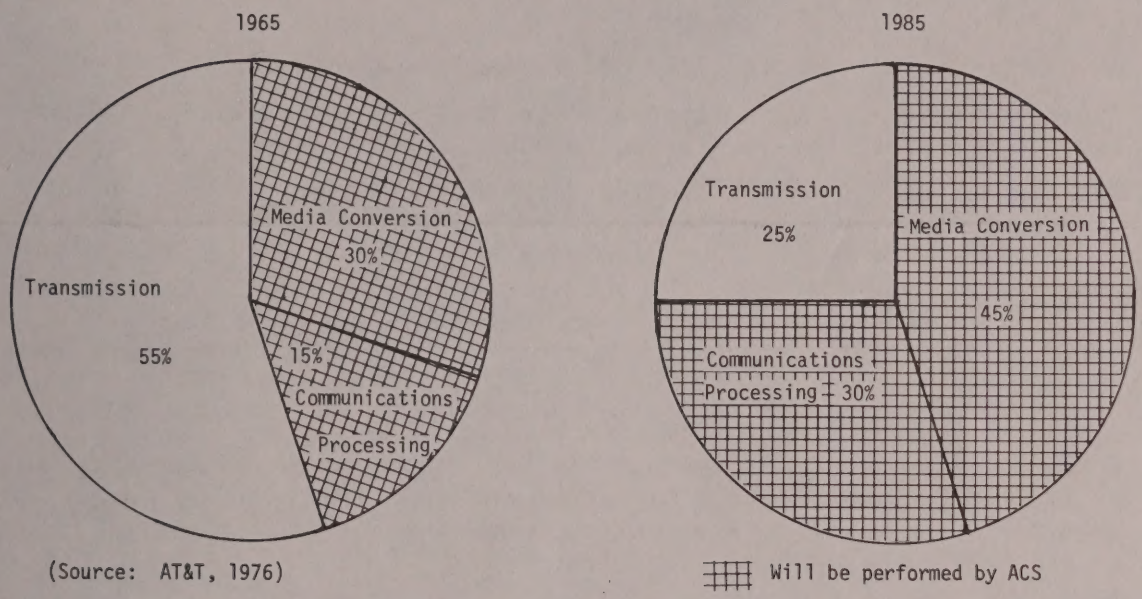
we may see a terminal at every desk. The ACS rate structure will be a determining factor in this evolution, but chances are the economics will favor a proliferation of terminals. And using a terminal can be like eating peanuts, so EDP/IR expects companies subscribing to ACS may discover a large unplanned use of ACS in the proliferation of electronic mail. The next step, unproposed as yet by AT&T, would be to enable the ordinary citizen to access this service, either via terminals set up in shopping centers etc. or via super duper phones that have alphanumeric keyboards.

SHIFT IN COMMON CARRIER REVENUES



(Source: AT&T, 1976)

Will be performed by ACS

AT&T expects data communications revenues, including those for circuits and terminals, to grow from $1.5 billion in the mid-60s to $5.5 billion in 1975 and $22 billion in 1985. Transmission is straight traffic; media conversion includes I/O to the communications facility; and communications processing includes switching, store-and-forward services, packetizing, message handling, etc.

Although the crystal ball is hazy, could it be that ACS might in time become so large that the voice network might be a subset of Bell's primary offering, ACS? And what about added capabilities, such as teleconferencing via Picturephones or large screens a la the SBS service? Video now takes a broader bandwidth than voice, but that may change. It looks as if ACS could be to the rest of the world what SBS plans to be to its coterie.

AT&T is somewhat vague about commitment on the size of the network and the rates. It plans to offer the service initially in "as many as" 100 metropolitan areas; additional areas will be included as the market develops. Access from outside the ACS serving areas will be available through private line, MTS and Wats services. Comments on rates are even more cryptic. AT&T expects certain elements, dedicated to specific customers, would be priced on a flat rate basis. Elements used on a demand basis, such as network transmission and message storage, would be priced on a usage sensitive basis.

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WHAT ACS WILL DO FOR YOU

- Compatibility among terminals -- ACS initially will support five classes of terminals that represent over 66% of all installed general purpose terminals -- or 450 models from 100 makers. The classes include:

  1) Asynchronous 110 to 1,800 bit/sec character mode, Ascii, start-stop contention: TTY models 33, 35 and 43, glass TTYs, Dataspeed 40/1.

  2) Asynchronous buffered terminals operating in block mode: Dataspeed 40/2 and Hazeltine 2000.

  3) Asynchronous polled: IBM 2740 Model 2 and Dataspeed 40/3.

  4) Synchronous polled, both cluster controlled and stand-alone; to 9,600 bit/sec. Supports bisynch polled protocol: IBM 3270s and Dataspeed 40/4.

  5) Synchronous contention, including batch and RJE stations up to 9,600 bit/sec: IBM 2780.

- Compatibility among hosts will be accomplished in a three-phase process. Initially it appears mainframers do not have to do anything in order to utilize the system, but eventually having X.25 probably will be to their advantage.

  1) Emulation support -- ACS will initially simulate certain classes of character-oriented terminals so that the host computer interfaces with ACS as if it were communicating directly with its associated terminals. This requires few changes to applications software making it easy for customers to climb aboard, but lacks some features.

  2) Message level interface -- allows the host computer to communicate with ACS on a "message handler to message handler" basis and relieves the host of supporting each remote station individually. Offers functional separation of network control from the application interface with the host. The message level interface uses a bisynch link control protocol.

  3) Bit oriented interface -- functionally comparable to message level interface but designed to be consistent with X.25. Initially ACS will use packet switching but might add circuit or line switching techniques to facilitate efficient transmission of bulk data.

- Classes of service -- Call features provide bidirectional transmission, especially suited for real time interaction. Message features handle blocks of customer data assembled at the originator's terminal and send it on a one way trip utilizing a store and forward technique.

- Customer customization features are available for both the Call and Message classifications. These include several sophisticated editing functions, including the use of a forms definition language that establishes parameters to aid in message preparation such as page length. Use of ACS DP capabilities is evident: the system will translate customer programs and return reports to allow customer testing; furthermore the system will "establish, administer and manage customer programs in the network." A customer-developed feature is made available only to those terminals specified by that customer.

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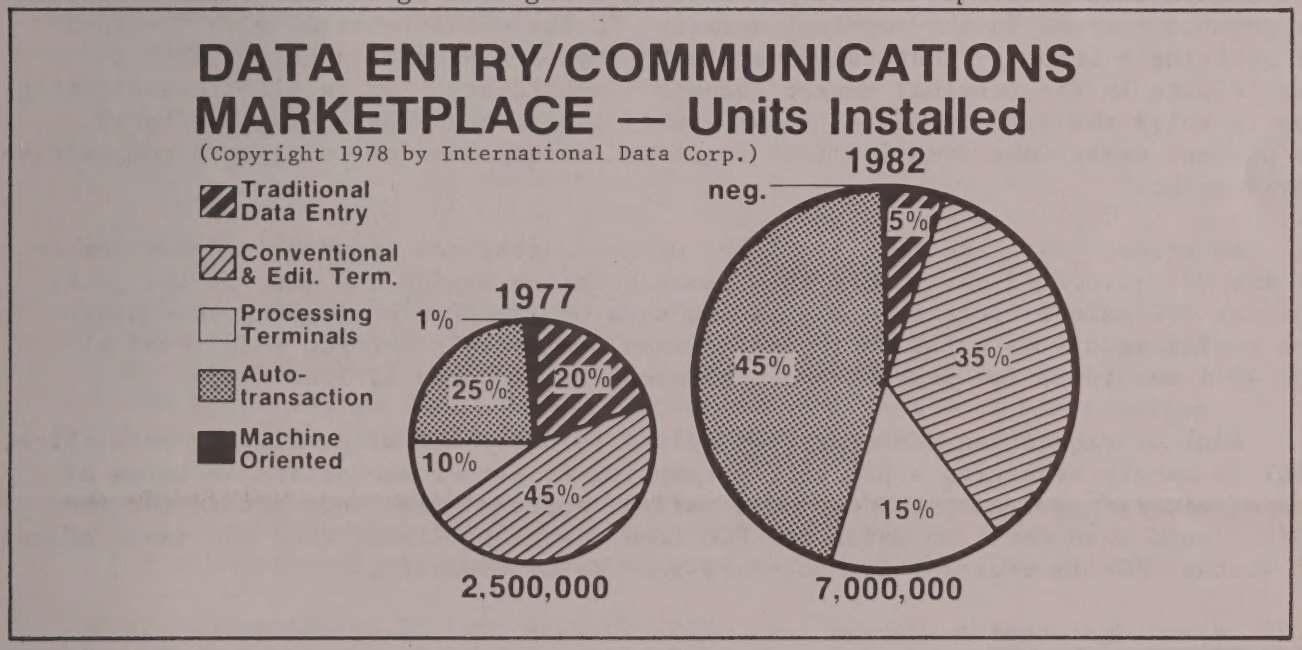
How rapid the acceptance?

ACS may be more of a boon for the smaller and intermediate size users of telecommunications (albeit large companies) than for the current very large users of networks. The latter are expected to show reluctance to adopt a common protocol because their individual networks are custom designed to optimize the DP environment. Although the communications costs may be lower via ACS, the resultant computer processing costs could obviate the communications savings, according to Phil Onstad of Control Data Corp.

Bell's proposal gives rather modest figures forecasting the connection of 137,000 customer terminals and computers to ACS by 1983 out of a projected total of 3.6 million terminals and computers. That's less than 4% of the installed customer base. EDP/IR suspects that within five years of the service's birth, it will start to accumulate a massive customer base that could be as high as 9% of the installed terminal and computer base. Considering that very large networking users, such as airlines, might not be among the first on board, the 9% is actually a hefty chunk of the potential market.

Bell's projections seem on the low side. IDC estimates there will be 6.65 million terminals installed in 1982, of which a hefty portion belong in the auto-transaction category. Add to this figure an installed general purpose computer base in the U.S. of approximately 67,200, plus 792,900 minis, for a total of 7.5 million computers and terminals in the U.S. in 1982 -- just about double AT&T's estimate. These figures exclude traditional data entry devices such as key to disk units. The following chart gives an idea of the marketplace breakdown.



What's in a name

Interesting to note the name changes this potential offering has already undergone. It started out as the Bell Data Network, but that contained the verboten word "data," which might cause the FCC to put a stop to it before it started. Then it was the Advanced Communications System, from Ma Bell, whose motto is the "System is the solution," but system can connote data processing without too much imagination, so the term is now Advanced Communications Service. The current name seems designed to connote solely comunications.

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Regulatory maze

With the regulatory scene being what it is, Bell is wise to not overlook connotations from names. Currently the whole foundation of the regulatory structure is being considered in Washington, D.C., and attempting to predict accurately what the determining guidelines will be when ACS comes up for consideration is like trying to nail a jellyfish to the wall. There are several factors currently spinning in Washington's barrel including the Communications Act of 1978 (EDP/IR, June 26,) and the Computer Inquiry II, both of which are seeking ways of eliminating the 1956 Consent Decree's barrier to AT&T's participation in nonregulated markets. But the Justice Department, which is still pursuing its antitrust case against AT&T, is hardly likely to want to see the Consent Decree crumble. And AT&T has been very content to bend the Consent Decree to serve its purposes -- it has managed to get the FCC to tariff the 40/4 -- so it hasn't been rebuffed in its efforts, conscious or not, to enter the DP arena.

Thus the paradox facing the FCC: ACS looks like a boon to users -- but at the same time emphasizes value-added features clearly related to DP. Certainly it would only be stretching definitions a bit further to tariff ACS than it was to give the nod to the Dataspeed 40/4.

The Computer Inquiry II, at the behest of the FCC, has started its proceedings, but is not heading directly into the heart of the issue: to determine where the dividing line is between communications and data processing. Rather, the Computer Inquiry II is concentrating on the terminal markets. During its July meeting, the Common Carrier Bureau of the FCC expressed the desire that all common carriers be able to compete in the terminal market. So the CCB is charged with the task of plotting a strategy that could modify the Consent Decree to permit AT&T to participate in the terminal market through a subsidiary. It is also investigating how to solve the quandry of what constitutes a separate subsidiary in efforts to prevent cross subsidization from regulated enterprises to those in a competitive environment.

An attempt was made to discern the DP-communications boundaries. One member of the CCB advocated the theory that communications begins and ends at the jack, but the FCC said it felt it could not go back on its previous ruling that okayed the tariffing of the 40/4. Interesting when one recalls the FCC's approval of the 40/4 was tentative pending the communications Inquiry II findings.

And, by requesting a declaratory ruling to offer ACS with existing facilities, AT&T is merely repeating a pattern, attempting to garner ammunition in terms of a preliminary nod from the FCC. Such initial approval like that gotten for the 40/4 could then serve to deter the FCC from reversing itself when the issue arises of whether ACS is crossing the boundary into data processing.

X.25 a moving target

Ma Bell acknowleges in her ACS proposal that there are several variations of X.25 and said she hopes to powwow with others to agree on a version. X.25 has come a long way from the days when it was a concept, but it is not cast in concrete and may never be, given the methods of operation of the international standards body, CCITT. That body has received over 300 "contributions" or suggestions on X.25 this year. Furthermore, sub protocols are needed to allow interfacing into and out of X.25, such as an asynchronous, low speed protocol to get data from a terminal into the net and a bisynchronous, high speed protocol

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to get data from X.25 to a host computer. Thus, standardization for X.25 involves more than a few details.

A "true" X.25 discipline requires the data to be entered in the protocol, according to Onstad, who is active in international standards work. Some packet nets provide "padding" that allows many protocols to interface to the network.

The first true X.25 net will probably be the French Transpac, which should be operational late this year or early next year. Transpac, designed to be as close as possible to X.25, will more than likely form the basis for the protocol, he observed. Other European countries are also pushing to have their own X.25 nets, which should provide incentive for vendors to move toward adoption of the standard as well as for an increase in the number of systems in Europe because the transmission should be so much better than the current, expensive, voice-grade lines.

Alphabet soup of vendors' nets

Although all of the major vendors either have or are planning their own networking schemes, nearly all have indicated they are considering offering X.25 compatibility for at least part of their product lines. Thus it looks as though the lineup will be X.25 vs. SDLC -- unless IBM decides to join the crowd. (It will provide to French and Canadian users a network interface adapter and software that links some SNA products such as the 3270, 3790 and System 32 to the X.25 nets. But the offerings are RPQs.) Computer Automation is covering all bets with its Virtual Network that accommodates X.25, SDLC and bisynch (EDP/IR, May 5). HP indicated it is committed to both X.25 and SDLC. Vendors' nets don't fit into neat pigeonholes, but here's an encapsulated rundown:

- Univac's distributed Communications Architecture's (DCA) protocol, universal data link control, features TTY compatibility and will offer 2780, 3780 compatibility. Univac is considering X.25. To link to non Univac hosts or nets, users write software using the Adapter feature.

- NCR's Distributed Network Architecture's (DNA) data link control is bit oriented similar to high level data link control (HDLC) standard. Specific future products will be X.25 compatible. Other computers can be linked to DNA, but only after endowing them with DNA's unique higher level system protocol. DNA's debut is on the 2140.

- DECnet's Digital Network Architecture (DNA) is a packet switching net and DEC is considering offering X.25. Linkage with other brands is accomplished via protocol emulators such as 3270, 2780 and 3780.

- HP's Distributed Systems Network (DSN) uses bisynch at the link level and nets connect to IBM CPUs via 2780, 3780, Hasp II. It also can use RS232C for interfacing at a lower level. HP will provide both SDLC and X.25 compatibility.

- Honeywell's Distributed Systems Environment (DSE) utilizes HDLC as native protocol and also features bisynch and TTY. It can link with other CPUs. Honeywell has not said if it will offer X.25 compatibility.

- Burroughs will announce its network architecture this fall.

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• THERE WILL BE A HOT TIME IN THE OLD TOWN FRIDAY, Aug. 11, when mainframers discuss their dislike of the proposed channel level I/O interface standard at a meeting at the National Bureau of Standards (NBS). The mainframers are expected to take their case to the public in addition to funneling their objections through the Computer and Business Equipment Manufacturers' Association (CBema). The proposed channel level I/O interface standard, patterned after the 370 design, is the most controversial of the three standards under discussion, which include a power control interface and channel level operational specifications for mag tape. Critics say the standard is ancient and would limit channel speeds and architectural improvements. NBS standards are voluntary; the real enforcement comes from adoption by the government (and all its buying power), which generally prompts manufacturers to conform to the standard in order to sell to the feds. Significantly, the third draft of the Federal Information Processing Standard (Fips) appears to be back to Square One and suggests enforcement of the standard. For example, a waiver of the standards could not be granted by the individual agencies (as was the case in the second version) but only by the Secretary of Commerce. Gone is the portion indicating a system "support" only one to four interfaces, thus allowing federal procurement of equipment with no such interfaces. Back is the original requirement that all channels of new and replacement systems conform to the specifications. The technical portions of both the NBS and Fips standard are based on the X3T9 committee's proposal.

• FOR THOSE NUMBER-CRUNCHING, SCIENTIFIC BUFFS, the designer of an array processor, Culler Harrison Inc. has put together a system featuring parallel processing at multiple levels that it claims can handle scientific problems faster than the CDC 7600 at less than one tenth the cost. The CHI system has six independent micros: an array processor, a macro-processor that serves as host computer; and four I/O processors that have a separate data bus into the memory of the array processor. Instruction words are organized so that different operations can be performed concurrently within each cycle, the company said. Prices start at $325,000 from the company in Goleta, Calif.

• THE STAMPEDE CONTINUES TO JAZZ UP OFFICE EFFICIENCY. Lanier Business Products Inc., offers a typewriter that has a small floppy disk to help typists calculate accounts receivable etc. It also features automatic decimal alignment. Lanier just picked up distribution rights in the U.S. to the Wordplex line of word processing systems as a result of the acquisition of Wordplex Corp. by Canada Development Corp. Dennison was the previous U.S. distributor. . . . Minolta Corp. has taken a different tack with copiers by replacing the lens and mirror system with a wafer containing "focused" fiber optics. Rather than act simply as a conduit, the fiber acts like a converging lens to focus the path of the light as it passes through the fiber. Elimination of the lens system contributes to smaller size and lower cost -- about $2,000 -- better reliability, and possible energy savings. . . . From the folks who brought you a machine that translates printed material into spoken English comes a $100,000 or so OCR system that handles any type font or combination thereof. Kurzweil Computer Products, Inc., Cambridge, Mass., said its Kurzweil Data Entry Machine reads about 30 char./sec with an error rate as low as one in 20,000.

• NATIONAL SEMI HAS SET UP A BUBBLE MEMORY operation under Dr. James Cunningham, who is eyeing the disk and tape replacement marts. By 1980, annual U.S. sales of bubble type memories should be about $50 million, he said.

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EDP industry report

• THE INTERNATIONAL DATA CORPORATION'S NEWSLETTER FOR EXECUTIVES CONCERNED WITH THE ELECTRONIC DATA PROCESSING INDUSTRY

"THE GRAY SHEET" July 14, 1978 • VOL.14,NO.2 P.J.McGOVERN,PUBLISHER

Memorex vs. IBM ends with hung jury -- Page 5

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SERIES/1 ACQUIRES DDP CAPABILITIES: BIGGER ROLES EASY TO ENVISION -- 'POOR MAN'S 3705'?

1979 -- Company ABC has installed a Series/1 as a front end to a 370. The mini communicates with older, bi-synchronous terminals while a 3705 handles a larger number of newer SDLC terminals.

1980 -- Company DEF has completed installation of a large distributed network in which remote Series/1s, programmable by the individual users, communicate on a multipoint basis with eight Series/1s that serve as front ends to a large IBM mainframe.

1982 -- Company GHI has surrounded its central 370 complex with a ring of Series/1s, each of which is tailored to handle specific tasks, such as communications control, language processing, and other chores.

1984 -- GSD, formerly IBM's General Systems Division, has become a separate corporation. Company GHI has replaced its central 370 complex with a ring of Series/1s, both local and remote. Communications remain a mixture of bisynch and SNA.

IBM's Series/1 from General Systems Division (GSD) is growing up fast, considering it was introduced two years ago as a bare bones mini without communications or software. It appears GSD intends to continue the evolution of the Series/1 rather than obsolete it with different models and nomenclature. The latest round of announcements will help beef up the portion of GSD revenues from minis, currently 3%, and, likewise, IBM's share of minicomputer revenues. IDC estimates IBM's 1977 revenues from minis at $70 million or 3% of the market. By 1981 IBM's share should be over 15% when IBM will be shipping 20,000 units, producing revenues in the neighborhood of $1,265 million. But most (80%) of IBM's Series/1 sales will merely increase the size of the mini mart rather than take away someone else's share.

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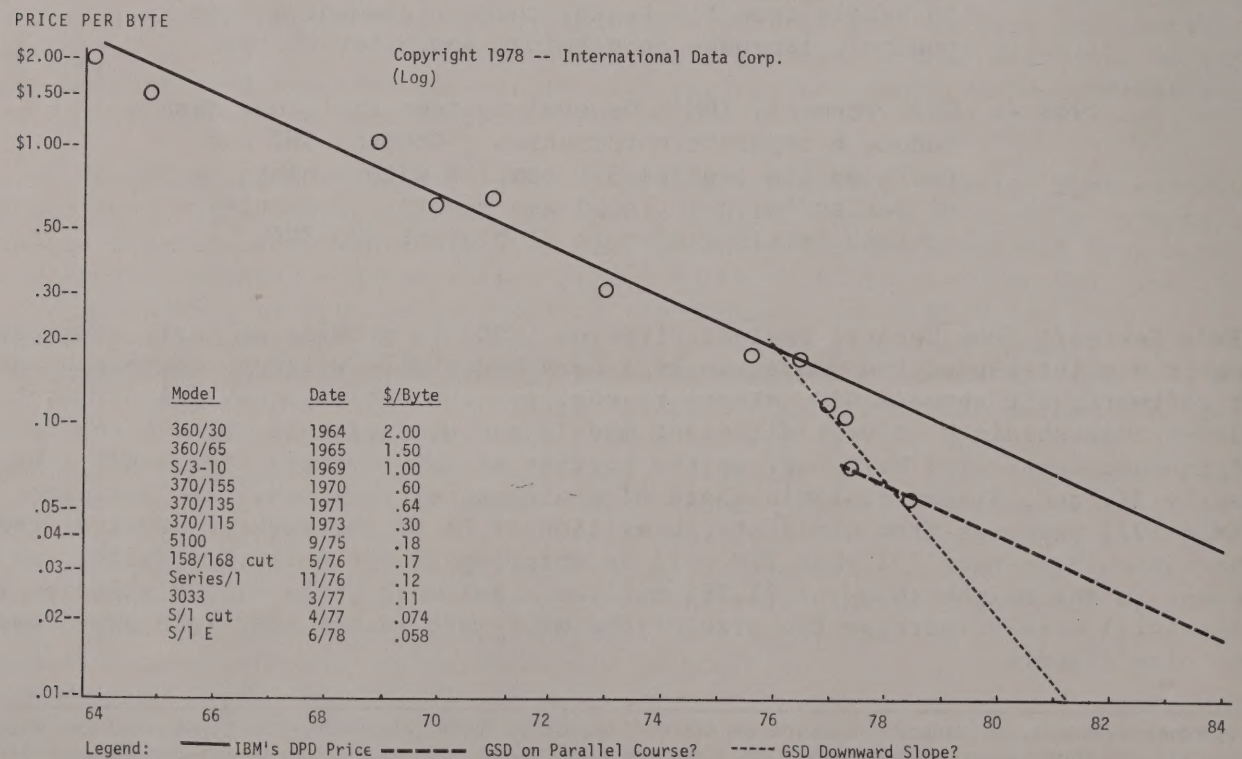
Destined to assume a key role in distributed processing, the Series/1 appears to offer an alternative to IBM's Data Processing Division's (DPD) version of distributed data processing (DDP) in that it allows the remote user to program it. Previously IBM's concession to the DDP trend was the 3790, which is downline loaded from the central site, does not have much disk storage (@29 Mbytes), and is expensive.

The Series/1's new capabilities provide several building blocks for implementation of DDP. It can be a "poor man's" 3705, front ending older, bisynch terminals and other Series/1s. Thus a user can have a 3705 handling newer, SNA-type terminals and keep his installed base of bisynch terminals without cluttering the 370X with bisynch demands.

Some of IBM's latest birthday presents to the Series/1 may be significant indications of future actions by big brother in White Plains.

Memory Price -- IBM's GSD has reached a new low price of 5.8 cent/byte,($3,800 for 64K) with the 2K chips available in 64K cards on its newest processor, the 4955 Model E. The previous low price from IBM was also on the Series/1, 7.4 cent/byte with 32K cards. To bring its current models' memory more closely in line with the latest offering, IBM effected a 9% cut on its 32K cards for the 4953 and 4955 models C and D. Their memory now is priced at 6.8- and 7.9 cent/byte. But low as that may seem from IBM, HP offers memory using 16K RAMs for a price of 3 cent/byte.

Armonk has been sitting on its 11 cent/byte price for a year while Atlanta has carved a steeper downward slope.



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Cobol, enhancement to Fortran -- With the addition of a lower-level Cobol, IBM is paving the way for the System/1 to become a useful tool in the overall scheme of distributed processing, whatever the version. The Series/1 Cobol is upwardly compatible with the 370's OS/VS Cobol compiler and Library Release 2, and tailored to provide extensive I/O capability, IBM indicated. Thus users can transfer application programs in Cobol between their 370 and Series/1s.

Faster, larger CPU -- The 4955 Model E doubles the maximum main memory available in a Series/1 -- 256K, putting the E in the supermini category. The minimum model has 64K for $11,000. The average instruction time (weighted) is 2.65 microsec vs. the previous model's 3.9 microsec.

Disk technology and capacity --Disk capacity of the new 4955E processor can be over 1 billion bytes. The new drives are a 58 Mbyte with 128 bytes fixed head, and a 64 Mbyte moving head unit, both nonremovable. Up to three additional drives may be intermixed and attached to a primary drive, wherein resides a microprocessor making its debut in IBM products. The 1/4-in. chip has 2,250 logic circuits. The feasible limit per CPU is four to six subsystems, or 24 drives. The theoretical limit per CPU is 64 subsystems or 256 drives. There is one attachment card or controller for each primary drive.

The technology of the drives is similar to that used in the new System/34 drives, about which IBM is saying little. Although the industry is speculating on whether IBM has in fact started using eight inch disks, Control Data Corp.'s P.W. Arneson, vice-president of the Miniperipherals/Terminals Division, feels the new IBM is probably a 14 in., conventional oxide disk rather than new plated technology. The disks are faster and offer better price/performance than the previous 4962.

	4962	4963
Average access time for movable heads (msec.)	40	24
Average rotational delay (msec.)	10.1	9.6
Data transfer (byte/sec.)	889,000	1.03M
Maximum Capacity/Drive (Mbyte) (includes 48K of floppy)	13.9	64
Fixed head portion (bytes)	122,880	131,072
Price/Byte including attachment card (cents)	66	18 (primary)

Certainly the 4963 is a very competitive peripheral, something of a rarity from GSD, which has encouraged participation by independents in the Series/1 peripherals market. The 4955E will accept the older drive, so IBM is not precluding others from participating, but it has added spice to the game. Prices are in the range of what other minimakers charge for 20 Mbytes. The 54 Mbyte version is the more expensive, because of the fixed heads: $11,420 for the primary (includes micro controller), $9,720 for other; $10,700 for the 64 Mbyte primary and $9,000 for the others. A subsystem attachment costs $1,530.

For its floppy magazine, IBM used the same techniques as with the 34 floppy's juke box affair. The Series/1's 4966 diskette magazine unit provides access to 23 diskettes and storage of up to 27.8 Mbytes. The price tag is $4,705.

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The disk products from GSD are all the more interesting when compared with the inactivity in new products from Armonk. The 3350 made its debut in 1975; the time would seem ripe for something new. However, IBM is still shipping these in significant volume, so perhaps it is too early for a mid-life kicker.

Building blocks to DDP

Poor man's 370X -- The Series/1 can act as a front end, linking directly to a 370's selector or block multiplexer channel via 200 ft. of cable. This permits the 370 and Series/1 to swap applications program data at channel speed, thus making some applications economically justifiable. While the Series/1 is not as versatile as a 370X and does not support the newer terminals (without a lot of complex user programming), it should do the job for users who want to retain their existing terminal bases without clogging up a 370X with bisynch terminal lines. The Series/1 strong point is its ability to handle bisynch communications. The obvious missing link is the lack of software making it easy to use SNA capability. It looks to EDP/IR that GSD will evolve that capability in a cautious manner. Remember its relation with DPD -- one has to leave big brother with some goodies . . . or else? (See page 5).

Up to eight Series/1s can be local front ends to a 370's block multiplexer or selector channel and each of these can communicate with other Series/1s as well as a host of terminals. The connection provides 32 ports to the 370 channel and one port to the Series/1. The 370 must be using OS/VS1 or 2 and BTAM using a subset of 3272 commands. Conceivably a user could have a Series/1 linked to older terminals and a 370X for the newer terminals. IBM's DPD does not lose face by openly admitting users were reluctant to adopt SNA lock, stock and barrel, which appears to be the case.

The Series/1 has had the ability to act as a cluster controller for a 370 SNA network, but that capability is contained in a macro language requiring user programming at a relatively sophisticated level. In the latest announcement IBM implemented in firmware the ability to provide multipoint connections for Series/1s under control of a 370 with OS/VS1 BTAM and for 3271 and 3275 control units. Another new feature is the capability to reset pending I/O on any bisynch or asynchronous device.

There is a slight indication VTAM capability could be added later. The Structured Programming Facility (SPF) operates with and extends the power of 370's Time-Sharing Option (TSO), performing full screen display editing and scrolling. Communications are via Series/1 SPF MVS/VTAM or SPF MVS/TCAM programs.

Future roles for Series/1

Thus it looks like IBM's GSD has taken upon itself the task of off-loading 370s. Could a Series/1 be used as a disk controller, while another takes care of various TSO tasks and assorted communications tasks? Front ends, back ends and specialized language processors have been quietly inching their way towards prominence, and it looks like Atlanta is going to have everything in place by the time these are in vogue. Viewed from one perspective, the announcement looks like the little aggressive brother has bitten off as much as he suspects big brother will let him get away with. But on the other hand, the pieces mesh nicely and form a larger, well designed picture of networking capabilities that eventually lead to surrounding a 370 with Series/1s -- possibly to ward off the plug compatible mainframe manufacturers (PCMMs).

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Little brother growing up?

The relationship between DPD in White Plains and GSD in Atlanta has been the subject of numerous rumors hinting a possible break up. Chairman Frank T. Cary recently confirmed the Giant is studying the possibility of splitting off the General Business Group as a worldwide subsidiary wholly owned by IBM. The General Business Group is comprised of General Sysems Division (GSD) and Office Products Division (OPD) as well as the Information Records Division and two divisions providing international marketing and R&D. The study, which will take several months, is looking at how the company can best serve its customers in the countries where it operates. The focus is on self sufficiency. The General Business Group does business in 21 countries in addition to the U.S. Of course, the announcement of the study could be part of a trial balloon that will eventually launch a legal settlement with the U.S. Government.

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DID ALL THE FACTS EQUAL A "CATCH 22"?

While litigation watchers await the next series of moves that lead to a rerun of the six month trial of Memorex vs. IBM that ended with a deadlocked 9-2 jury, observers are wondering whether Memorex -- and its financier, Bank of America -- will opt for another bout or elect to settle out of court. Memorex has already poured sizeable sums of money and vast corporate resources into compiling data bases and other machinery to support its giant legal effort. And a bird in hand would appear to be worth two in the bush. Memorex' financial situation, although greatly strengthened in the past few years, still shows a lot of debt -- $143 million last March. While these facts might add up to an inclination to settle, one must consider the wishes of the Bank of America.

Evidence in the U.S. vs. IBM suit indicates that Bank of America suggested Memorex file the suit and had an agreement with Memorex that it would be repaid in full from the award to Memorex if the suit was successful. Thus, Memorex might well be serious when it says it will pursue another trial. And then there's IBM. A case that could have served as a trump card for IBM -- a trade secrets theft charge -- was dismissed with prejudice, so IBM cannot resurrect that particular issue as a bartering point for a settlement.

It looks like the Memorex case will be with us for some time, unless there is a settlement. The progression toward a new trial entails:

- Judgment on IBM's request for a directed verdict, which Memorex will appeal if granted. If denied, the status quo is unchanged and
- Memorex will ask for a new trial.

Settlements appear to form a pattern with IBM agreeing to purchase some research and development from the plaintiff -- a la Sanders. IBM attorneys may have to do some fancy footwork, time-sharing among various cases that could rise from the dead. Greyhound is up for a new trial, Calcomp is being appealed, and Transamerica is scheduled to start in early November. The task of defending IBM's honor is becoming more onerous.

Of interest to the U.S. vs. IBM case is the statement by one juror that the jury agreed IBM did not monopolize the general purpose systems market. The two men who held out for IBM include the foreman, who works for Western Electric

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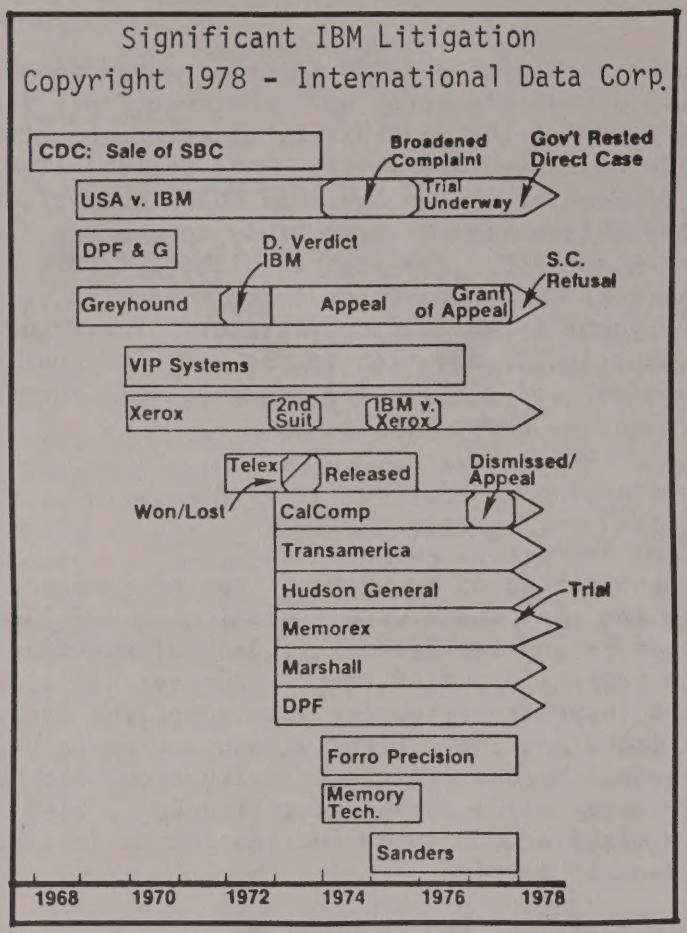

installing telephone switching gear and knows about computers, and a production worker at the Defense Supply Agency.

Memorex has shown it can conduct an impressive, if not totally persuasive, case, relying heavily on IBM documents. And the jurors voting for Memorex cited the documents as being a very convincing part of the case. One observed that IBM failed to refute the documents, but instead concentrated on what might be called "character witnesses." That nine of the eleven jurors found for Memorex is impressive in light of the lack of animation on the part of the Memorex attorneys when compared with the leprechaun-like quality of IBM's chief attorney, Patrick Lynch, whose tenaciousness and grasp of facts were commended by seasoned trial observors.

Many in the jury apparently had difficulty agreeing on interpretations of the judge's 81 instructions. And, as excerpts from the closing arguments show, the jury was presented with a dilemma. Memorex obviously had searched IBM files diligently . . . and cross-matched material . . . and was able to tie together statements that implied intent of sorts. IBM, for its part, focused on the bigger picture . . . and often presented the jury with a "Catch 22" analogy.

Memorex searched files

According to the Memorex summary of the "Smash" announcement of the 3330, IBM had ripped the control unit in two. The plaintiff found a memo from Cooley to "Mr. B.O. Evans, his boss, the president of Systems Development, and saying:

> 'As you know, there is no new engineering with regard to the logic on directors. Existing control units are merely split apart and repackaged with part of the logic in the drive and the remaining part in the appropriate CPU.'

". . . Now, again why does IBM rip apart a perfectly good product and arbitrarily repackage the remaining parts?" asks Memorex attorney John Endicott. "Again, the purpose is clear, exclude competition." Memorex made quite a thing of IBM code names such "Smash" and "Stripim" and found a memo that stated:

> 'For security reasons and operating plan convenience as well as to maintain consistency with current doctrine in DPD, please delete all references to the Smash Series in future correspondence, foils, flip charts and other media.'"

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In analyzing "Stripim" (IBM's analysis of PCMs), Memorex looked at IBM's change in attitude regarding offering term leases. It quoted 1969 memos recommending that IBM do it ". . . on the 'guts,' and not on the analysis." IBM rejected term leases in 1969 because "there is no way to just limit it to peripherals," but then -- as Memorex points out in a sarcastic manner -- IBM decided long-term lease plans would provide a gain over $700 million.

And on and on. Memorex tied together lots of internal details -- memoes from people who hold top jobs today, people such as Rizzo, Cary, Opel, Papes --and finally said it had proved its point.

"It may be hard sometimes to draw a line between reasonable responses to competition and conduct that unnecessarily excludes competition, but whatever the difficulties may be in a close case, this, I submit, is not one of them. It was clearly exclusionary conduct done with exclusionary intent, and that in the terms of this case, translates into illegal monopolization and the attempt to monopolize."

For its part, IBM stayed away from specifics, going for reason. IBM's attorney, Pat Lynch, picks up on Endicott's statement above and says he agrees it's hard to draw the line, and "there are some acts which are just prohibited. Fine." But he suggests the jury should look beyond individual details:

"Look at what IBM did. Look at the actions that IBM announced. Were they profitable products? Yes, they were. Were they lower prices? Yes, they were. Were they new and improved products? Yes, they were. That's what IBM did. Did somebody think about doing something else? Maybe. I don't know. We'll talk about that. We'll talk about IBM's intention in the documents. But what IBM did in the long run is the best proof of what IBM intended. And what IBM did is competed. IBM went out to the marketplace with something new and better and said to users, 'vote for us. Vote for us instead of Memorex," etc. "And they got some votes. And basically that's what Memorex is complaining about."

Another IBM technique was to show how the company apparently was caught in the middle. Lynch describes the 3705 as a "switch hitter," available when announced as a 2705-compatible replacement; eventually enhanced to be an NCP machine. If, at announcement time, IBM had disclosed exactly where it was going that would be "A premature and misleading announcement. Anticompetitive." But if it didn't disclose all at the beginning, and as in actual practice waited six months to disclose the "new attachment strategy," that's " a misleading announcement because we didn't tell them what we were going to do for the next five years." This amounts to "Catch 22 . . . that's the Memorex argument -- Catch 22. You can compete, IBM, but when we see how you did compete -- Catch 22 -- you should have competed some other way...."

"IBM is a large firm. IBM is a successful firm. IBM is a firm that's done well by its shareholders but to say that IBM has the power to control prices or to exclude competition in this industry that's growing like topsy, and that's performing like nothing else you've seen or heard about, that's delivering these multiple improvements in product and multiple improvements in cost, to conclude that IBM was guilty of monopolistic practices is to say we shouldn't have a competitive system, we ought not to have a system, because a company that competes, a company that succeeds, a company that does everything our system asks it to do, that company, having prevailed, has nothing to look forward to but a slap in the face from the jury when it wins."

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• DEC AND ICL MAKE SYSTEMS TALK WITH IBM 370s on an interactive basis in efforts to grab a piece of the distributed processing mart. DEC has a software package that interactively links up to six 360s or 370s to a PDP-11 ($4,500 fully supported) by making the 11 appear as a 3271. The 11s can be added to an existing IBM multi-drop line along with other devices using bisynch protocol. ICL also stressed the interactive capabilities of its scheme for linking System Tens with IBM and also endowed the Ten with a 3271 protocol.

• BELL REVEALS ADVANCED COMMUNICATIONS SERVICE at last. In a filing to the FCC requesting permission to use existing Digital Dataphone Service facilities for a new commercial data transmission service, AT&T outlined its plans for a system that would allow various types of terminals and computers to communicate. Although a bit-oriented scheme is planned eventually, consistent with X.25, ACS initially will not support SNA or SDLC. Thus Ma Bell squares off against IBM.

• HP SYSTEMS AT HIGH AND LOW END smother an older product, the HP 2000. which has been dropped from the product line, although HP support will continue for at least five years. The top-of-the-line, 3000 Series III has four times the memory capacity (2 Mbytes), twice the throughput and lower cost memory ($32,000/ Mbyte) than earlier 3000s. The memory price was cut 46%, thanks to the use of 16K RAMs. HP similarly cut the cost of disk memory/Meg by 46% with a new 120 Mbyte drive that extends disk capacity of any 3000 to 960 Mbyte. A typical 3000 III with 1 Mbyte, 120 Mbyte disk, Cobol and Image/Query software is under $152,000 . . . . HP unloaded a basket of software, including an enhanced operating system that can run on the -II, expedites on-line transaction oriented applications and offers multipoint terminal interconnections enabling 32 local terminals to hook to one port and 32 terminals to connect via one modem channel. An optional automatic data compression that typically cuts Ascii transmitting time 40% is available on the DS/3000 networking facilities. And remote users of Image think the data base is local. . . . At the low end, HP is trying its hand in the small business field with the HP 250, that has a version of HP's Basic and is priced under $25,000. The standard system includes three software modules: Query/250, Forms/250 and Report Writer/250, and has 128K system memory, 32K available to the user. Two floppy drives are included (the system can accept cartridge disks) and a 180-char./sec printer. . . . HP did not forget the 1000 and bestowed its newest version -- F -- with 16K RAMs (350 nsec) and a new, faster processor and operating system. A hardware-executed scientific instruction set allows Fs to be as much as 26 times faster than systems applying commonly used software routines, HP said. Price start at $27,500.

• FROM BROWN HILLS TO GREEN HILLS, two California firms are expanding in Eire. Amdahl Ireland Ltd. opened a manufacturing facility in Dublin while awaiting completion of a larger plant in nearby Swords. Meanwhile, Computer Automation, Inc. plans to locate a manufacturing operation in Dublin. Location in Ireland eliminates tariff barriers among Common Market members.

• NEW MAN ON THE BENCH PRODDING the U.S. vs. AT&T antitrust suit is Judge Harold Greene, who has a reputation as a top criminal judge. He succeeds Judge Joseph C. Waddy, who has been ill. Whether Greene's skill in expediting criminal cases will be effective in a huge antitrust suit remains to be seen. However, observors say the pace of the suit can only quicken. In other action involving AT&T, the CCIA has protested to Justice that AT&T software marketing violates the 1956 Consent Decree.

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COMMUNICATIONS ACT REWRITE MAY HERALD MELDING OF COMMUNICATIONS, COMPUTER MARKETING

The House Subcommittee on Communications' recently proposed Communications Act of 1978 is the first of a couple of communications issues that will liven up an otherwise stifling hot summer in foggy bottom. Introduction of the Federal Communications Commission's (FCC) Computer Inquiry II findings, originally scheduled the same week as the Communications Act rewrite, has been postponed until mid July.

Taking a cue from the apparent pro-competition tone of the recent attempt to rewrite the Communications Act of 1934, EDP/IR can envision a scenario in which:

- Communications and DP are regarded as virtually the same ball park and open to all players, with minimal regulation if any.
- Traditional DP services firms are not only openly offering telecommunications services such as packet switching but are also venturing into other telecommunications areas such as FM broadcasting.
- Ma Bell has ceased being a "closet" supplier of DP gear and competes vigorously in that nonregulated market via a subsidiary.
- The additional number of players in each area has prompted growth in the industries, providing a piece of the market for nearly all.
- Believe it or not -- most players are happy, or at least too busy surviving in the fiercely competitive world to take the time to engage in lengthy debates as to who is infringing on whose territory.

Admittedly, much of the above scenario will not materialize unless the Computer Inquiry II vanquishes that perpetual bone of contention -- whether there exists, and what constitutes, the dividing line between communications, much of which is regulated, and data processing, all of which is unregulated. EDP/IR suggests the Computer Inquiry II could continue the work of the Communications Act rewrite and abolish the regulatory climate surrounding communications, thus endorsing the entry of communications firms into DP and vice versa. Such a move is not likely to happen with one stroke of the pen, but it is worth contemplating. Nor is there likely to be any prompt action on the Communications Act of 1978, for it will be at least two years before it is passed by the Hill, probably in a much different form, sources indicate.

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A LOOK AT THE COMMUNICATIONS ACT OF 1978

- Replace seven-member FCC with a five-member Communications Regulatory Commission (CRC).

- Rely on competition to provide "efficiency, innovation, and low rates and to determine the variety, quality, and cost of telecommunications services."

- Require the divestiture by Bell of Western Electric. The act states: "No person shall provide a noncompetitive service and also be engaged in the manufacture of equipment used in furnishing any common carrier service."

- Override the Consent Decree of 1956 that bars AT&T from participating in the nonregulated DP arena. The act says common carriers can hold shares in a separate company whose product or service the CRC decides is "telecommunications or incidental to telecommunications."

- "Prevent practices which would allow any carrier to limit or exclude competition in the provision of telecommunications services."

- Presume equitable any rate or term unless the service is a noncompetitive service. The CRC will determine what constitutes a noncompetitive service. All rates must be equitable, and the burden of proof is on the carrier.

- Allow common carriers to construct or extend lines after simply notifying the CRC. Currently the FCC has to approve such plans.

- Require common carriers to provide connections with other carriers upon reasonable request unless the CRC determines 1) "the establishment of such connection will result in substantial technical or economic harm to the common carrier ....2) "the harm to the carrier exceeds the benefits to the public which would be created by the connection being requested."

- Establish a Universal Service Compensation Fund consisting of payments by firms providing an intercity telecommunications service or facility connected with local exchange switches. The fund is to maintain toll and local exchange phone service at affordable levels and ensure the nationwide availability of basic voice telephone service.

- Require a common carrier to provide a noncompetitive service to a community if the CRC determines the expense will "not impair the ability of the carrier to serve the public." Conversely no carrier can discontinue a noncompetitive service unless the CRC approves the move.

- Prescribe for common carriers "the classes of property for which depreciation charges may be included under operating expenses and the percentage of depreciation which shall be charged with respect to such classes of property, classifying the carriers as it may consider proper for such purpose." Prescribe the form and content of annual reports.

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Door opens onto DP

EDP/IR anticipates the CRC will broadly interpret "incidental to telecommunications," thereby leading to a more active role by carriers via subsidiaries in the unregulated DP arena, and conversely, a more open communications market. A variety of future scenarios are possible:

- Western Electric Co. and Teletype Corp. could combine forces -- WE with its medium and large scale mainframes and Teletype with its increasingly intelligent terminals and growing field force.

- Bell could become a large factor in the merging, yet-to-be-defined office of the future arena where service will be a large factor.

- Bell could split itself into two companies, one offering "competitive" services and one offering "noncompetitive" services. The latter could keep Western Electric.

- Bell might not want to play in the unregulated market, and might restrict itself to telecommunications services. With Western Electric divested, it might acquire terminals and modems from several sources, thus becoming a big OEMer.

If Western Electric and Teletype were to decide to enter the DP arena, the entity could be "a formidable competitor," according to Ron Frank, a telecommunications observer. WE has expertise in making processors and Teletype, like Bell, has been reorganizing along industry lines in attempts to become more responsible to user applications needs, as indicated with its recently announced 4500 product line (EDP/IR, June12'78).

The familiarity of office workers with, and the responsiveness of, Ma Bell's fleet of trucks is hard to beat. The office market, eyed by Exxon with its Qyx and Quip units, and being courted with increasing fervor by IBM's Office Products Division, presents wide open territory for all concerned. Certainly here the prospect of merging and melding various disciplines -- transmittal of voice, data, video -- and the changes that could occur in office procedure are akin to or even exceed those of the days when DP was spreading rampantly. There are already communicating word processors, add to that facsimile and possibly even video -- yes, where is that long-awaited picture phone? -- and relatively sophisticated storage systems, all of which are controlled by the ubiquitous microprocessor, and one has a market in which Ma Bell could cut a wide swath. Bell already has phones that do all but make alibies for long lunches; increased capability in this area is but one logical extension.

As the third scenario suggests, the Communications Act rewrite by no means makes it impossible for Ma Bell to keep her hands on her wholly owned subsidiary, WE, that has a respectable annual revenue in the area of $8 billion. For purposes of comparison, the 1977 revenues from computer operations of NCR, Burroughs, Univac, CDC, DEC and HIS totaled $8.8 billion (EDP/IR, Feb28'78).

It is possible, although unlikely, that Bell and/or its relations won't want to play in the unregulated DP arena and will stick with network services. Assuming the divestiture of Western Electric, Bell might find it could obtain equipment from independents at attractive prices and/or that the equipment from independents provided additional features. This would open up that market.

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Loopholes and reservations

One of the major reservations voiced by industry participants is the fear that the bill does not sufficiently control AT&T in potential "competitive" areas in which Ma Bell has a virtual monopoly.

The Computer and Communications Industry Association (CCIA) would prefer to face six Western Electrics rather than one behemoth. It also wants the CRC to commit to regulating a monopoly.

Nowhere does the bill specify what is regulated and what is nonregulated. That is for the CRC to decide. And, in addition to the possibility that one part of AT&T could retain Western Electric, the bill does not mention the fate of Bell Laboratories, of which AT&T and Western Electric each own 50%.

One of the chief bugaboos of the FCC in regulating Ma Bell has been determining where she makes money and where she doesn't. To some extent a remedy is attempted in the section of the bill that allows Bell more modern depreciation procedures and requires specific statements. But the fear of cross subsidization is still rampant, for there is nothing in the bill preventing it. An example of cross subsidization and the resultant creative accounting is apparent in Bell's bid to raise the charges to MCI and Southern Pacific Communications (SPC) for its local loops. Bell is now saying its current rates have been subsidized by its long lines, and it should therefore increase the charges to other carriers.

The FCC has attempted to prevent cross subsidization by requiring subsidiaries be "at arm's length." But the current bill makes no mention of arm's length, or of what percentage a common carrier can own of a "separate company" that provides a product or service which is telecommunications or incidental to telecommunications.

Although there are loopholes, and the final details of the bill are expected to be vastly different, the bill does represent an attempt to eliminate a lot of the expense and wasted time now consumed in fighting over matters first with the FCC and then with the courts, as is the case with the MCI and SPC battle for the use of Bell's local loops which are needed for their services.

What's at stake

There's no question, there are a lot of dollars involved in the telecommunications realm -- $36+ billion in 1975, according to FCC figures. Although the FCC has tabulated its latest figures, it has not released them. Until the CRC decides what is competitive and what is noncompetitive, it is not possible to slice up the market. But the figures brutally show that the Monopoly Services, including local exchange, inter-and intra-state toll (MTS and Wats) and miscellaneous, total $31 billion, overshadowing the $4+ billion in competitive services (PBX and KTS and interstate private lines of which Bell has the giant's share. The competitive industry garnered $194 million in revenues for interconnect (PBX and KTS), specialized carrier, and satellite carrier.

It appears there's lots more to be gained by incursion of independents into Bell's monopoly area than there is by Bell's intrusion into the competitive industry. However, one must recognize the latter is still a fast developing industry, and Bell's presence could provide a dramatic incentive for growth.

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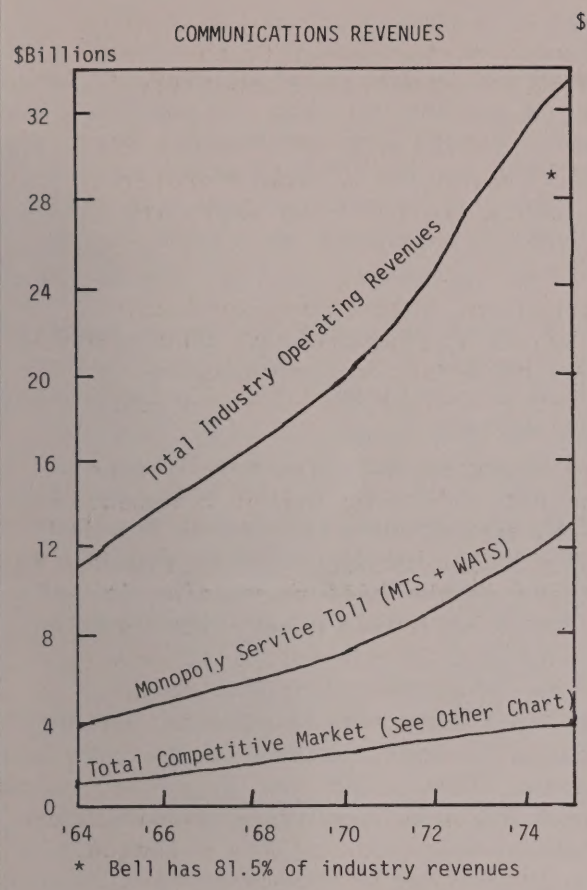
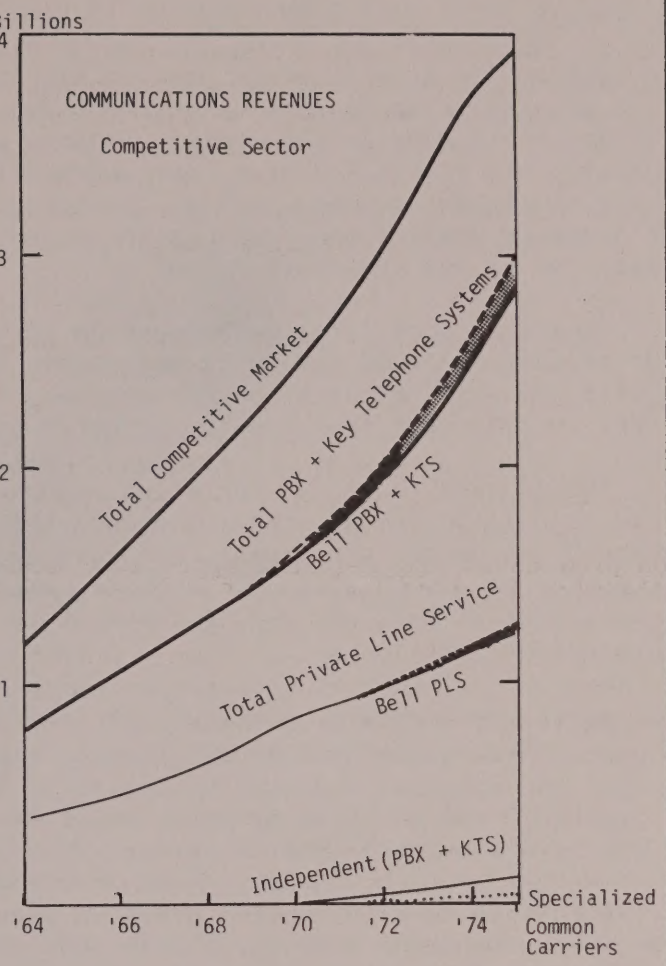
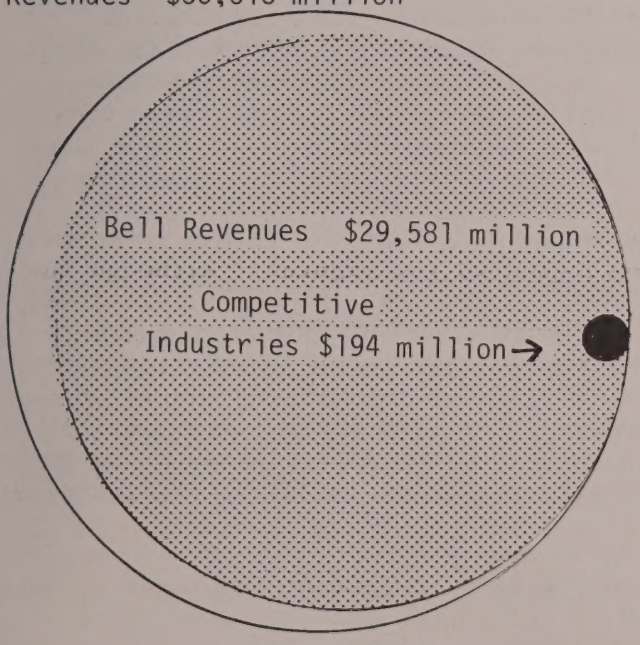




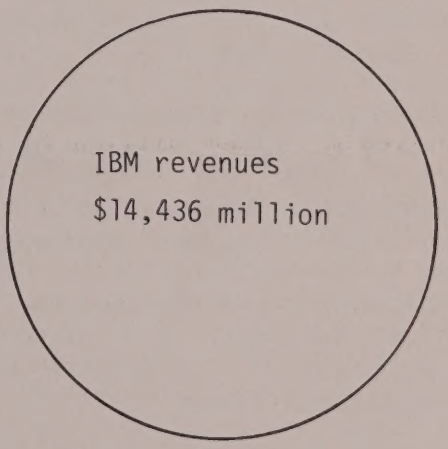
Source: FCC

Total Telecomm Revenues $36,313 million



1975 REVENUES

For comparison,



1975 REVENUES

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FUJITSU TO BRING DISK MANUFACTURING TO U.S.

Fujitsu is turning a new page in its history with the establishment of disk drive manufacturing facilities in the U.S. Long content to ship its manufactured disk drives to OEMs in the states, Fujitsu now, through Fujitsu America Inc., plans to accelerate its marketing of peripherals to OEMs and in 1979 to start manufacturing at its Santa Clara, Calif., facility. The U.S. plant makes subassemblies for Amdahl computers and also has sales and support personnel as a conduit for semiconductor and component sales.

The first peripheral to be made in the U.S. will be the M2201 front loading 50Mbyte (unformatted) dual disk drive that is compatible with SMD interface. Fujitsu has not indicated whether and when it will manufacture its Winchester-type drives, which range from 12- to 50 Mbytes unformatted.

EDP/IR sees the move, tentative though it may seem, as significant, for it could signal the second stage of a long term plan to expand its market penetration in the U.S. At the very least, the move should more closely identify Fujitsu as a supplier of disk drives. To further understand the potential and the existing capabilities of Fujitsu, EDP/IR looks at the whole corporation, as outlined in its annual report.

Fujitsu's worldwide goals are clearly stated in its annual report: "We intend to continue to place greater and greater emphasis on contributing to the development of the computer industry worldwide." During 1976, while the Japanese economy "stagnated," the overseas group at Fujitsu recorded a 164% sales increase. Some of the firm's overseas activities are:

- Fujitsu America Inc. -- plant in Sunnyvale, Calif., performs assembly of Amdahl computers; will make disk drives. Also has sales and support personnel as conduit for semiconductors and components sales.

- Amdahl International Ltd. -- joint venture with Amdahl Corp. established in Bermuda to expand worldwide marketing of Amdahl 470V/6 and Facom M-190.

- American Telecommunications, Inc. -- subsidiary for manufacture, sales of PBXs.

- Secoinsa -- Spanish firm in which Amdahl has invested substantially and to which it is providing technological knowhow.

- Edisa -- Brazilian consortium to which Fujitsu will supply licensing, technical support and training for the manufacture of small computers.

- Consolidated Computer Inc. -- Canadian firm in which Fujitsu has at least one-fifth of the stock. Fujitsu is providing licensing and technology that should result in small computer systems for the North American market.

- Marketing subsidiaries in Australia, Brazil, Spain and Korea.

- Amdahl Corp. -- American manufacturer of IBM-compatible CPUs in which Fujitsu holds 18% of outstanding shares.

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Fujitsu's computer systems group's sales exceeded $856 million in 1976, a 15.5% rise, and accounted for over 73% of the company's total sales for the year. Overall company revenues for the year totaled $1.171 billion with earnings of $33.2 million for the year ended March 31, 1976. In 1976, Fujitsu held a 19% share of the value of the Japanese market or 33.6% when excluding foreign makers.

Fujitsu has a wide range of expertise and can be expected to export the results in selected areas. To give an idea of the company's scope of product development, Fujitsu currently has:

- Optical fiber transmission systems with digital links of up to 32M bit/sec and digital regenerative repeater systems up to 400Mbit/sec.
- Facsimile equipment that transmits 750 char./20 sec. There is a multi-access function for facsimile networks.
- 600 gate/chip logic circuits. MOS logic with gate propagation delay of 140 picosec.

MICROS GAINING POWER

Power to the micro seems to be the slogan emanating from Silicon Valley. Data General and Intel both offer 16 bit units, while National has developed faster, more powerful units by combining different technologies on one chip.

The ubiquitous 8080 now has an even bigger, faster brother, the 8086, a 16-bit device that is designed to deliver 10 times the performance of the 8080. Features include addressing up to 1 Mbyte, hardware multiply/divide, instruction look ahead, elaborate string handling instructions, dynamic memory relocation, re-entrant program codes and position-independent programs. There are twice as many general purpose registers as on the 8080. The average time for typical instruction execution is comparable with that of many minis, and it supports multiprocessing. The 8086 is compatible with the 8080 and 8085 but not at the assembly level. A host of software and development aids are available. A prototyping unit complete with 4K RAM, bus- and interrupt controllers and other goodies, sells for $360. When the 8080 was introduced, it sold for $360 for a single IC --it now sells for $10 in single unit quantities. Data General, after eyeing DEC's success with its LSI/11 on a board, has jumped in with a 16 bit unit, the MicroNova Board Computer MBC/1, which provides full Nova architecture and is compatible with the Nova 3. And DEC has selected Hamilton/Avnet as a stocking distributor for its LSI microcomputer products.

National has a 50% faster version of its 2901A four bit slice microprocessor, the 2901A-1, which gives emitter coupled logic type speeds with the power required for LSI designs. Thus the plug compatible vendors can have faster speeds (a couple use bit slice) and possibly develop larger machines. National attained the higher speed by a fabrication technique called "Schottky Coupled Logic" which combines Schottky devices with ECL circuitry on the same die. All standard parts are pin and function compatible with the older unit. And by a process that combines Schottky TTL, integrated injection logic and linear bipolar devices on the same chip, National has a CRT controller that handles both the control logic and high speed logic functions. The DP8350 can replace as many as 40 discrete devices, and for $49 in 100 lots, has got to mean less expensive and/or more capable CRTs.

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• INDUSTRY-ORIENTED MARKETING SHOULD RESULT from DEC's "realignment." The shuffling at DEC makes the company structure appear less like a many-tentacled octopus and more like that of any other company. There are now three principal groups reporting to a four-man office of the president. The previous OEM and Large Computer Groups were intermixed among the three new groups: Commercial Products, Computer Products and Technical Products. Salesmen for each area within the Commercial Products will eventually have a range of products extending from the DECsystem 10 through minis. Currently there are separate salesmen for 10s, 20s, etc. Much of the impetus for the new organization came from the overlapping of areas. The Commercial Products area includes systems suitable for the insurance, manufacturing and financial industries as well as commercial OEM. The Computer Products group includes components, word processing, typesetting, and accessories and supplies. The Technical Products area handles products for the laboratory, education, engineering and government markets. The three groups report to the office of the president which includes Ken Olsen, Win Hindle, operations, Andy Knowles, marketing, and Bill Long, corporate planning.

• COMPUTERS AND BUSINESS EQUIPMENT DID LESS to help the U.S. balance of trade than previously. The first quarter export/import ratio dropped to the lowest level (2.10) in four years of reporting, according to figures from the Computer and Business Equipment Manufacturers Association (CBEMA). While industry exports rose only 18.1% over the same period last year, imports rose 36%, leaving the industry balance of trade up only 5.5% compared with the same quarter a year ago. But the industry balance ($564.4 million) is higher than any previous periods except the first and second quarters of 1977. Excluding office equipment, DP exports rose 47.6% to $587.4 million in the first quarter 1978; import numbers were not available.

• BYPASSING THE COMPUTER AND PAPER, 3M has linked its 3M Series 4000 Word Processing System and its 715 COM system. The word processor can record on 9-track tape in a format suitable for use by the computer output microfilm system. The only paper generated is that later produced on a selective basis from the microfilm. . . . Linking the computer's output on a color graphics terminal to a color printer has been accomplished by Ramtek. A $1,000 interface links the Ramtek 6200A terminal to the Xerox 6500 printer.

• NUMBERS GAME ... Digital Equipment Corp. has shipped over 100,000 computers excluding the LSI 11 microcomputer on a board since the firm's founding 20 years ago. During the company's first 15 years it built 50,000 systems; but in the next two and a half years it turned out another 50,000 systems. "We can now make as many products in a day as it once took us a year to build," President Ken Olsen observed. Meanwhile, Data General has churned out 50,000 computers. Hewlett-Packard since entering the terminal business in late 1974 has shipped over 25,000 CRT terminals. The company also has produced 15,000 of its Model 7970 mag tape drives since its introduction in 1970. There are more than 1,000 HP1000s..

• SIGN OF THE TIMES -- Controlling robots is the subject of a book from the National Bureau of Standards. An Architecture for a Robot Hierarchical Control System looks at an NBS-developed architecture for applying computer controls to robot systems.

• OCR WANDS ARE FOR END USERS AS WELL as OEMs. Recognition Equipment Inc. received a $2+ million order from J.C. Penney Co. Inc.

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